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ACCESS
DESIGN GUIDELINES

ACCESS REVIEW COMMITTEE
THE CITY OF CALGARY 1991

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THIS DOCUMENT IS INTENDED TO SUPPLEMENT SECTION 3.7 OF THE ALBERTA BUILDING CODE. REFERENCE MUST BE MADE TO THE CODE FOR ALL MANDATORY PROVISIONS.

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Harris and Dines, Time-Saver Standards for Landscape Architecture, Design and Construction Data, 1988, McGraw-Hill, Inc., New York.

We acknowledge the use of material from:

Alberta Labour, General Safety Services Division, Building Standards Branch, Alberta Building Code 1990, 1990.

Alberta Labour, General Safety Services Division, Building Standards Branch, Barrier-Free Design, 1985.

Harkness and Groom, Building Without Barriers for the Disabled, 1976, Watson-Guptill Publications, New York.

Mace, R., Accessibility Modifications, Special Office of the Handicapped, North Carolina Department of Insurance, 1979.

Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, Public Buildings, 1986.

Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.

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INTRODUCTION

Today people with disabilities are in the mainstream of society. A society, in which the opportunities are the same for everyone is enriched by the diversity of its active and contributing members, therefore, a well-designed environment which is safe, convenient, comfortable and readily accessible benefits everyone. Design solutions that also respond to the climatic variations in a winter city like Calgary increase and enhance the accessibility of the outdoors throughout the year.

The City of Calgary wishes to set an example by creating a more liveable and accessible city. To this end, it established the Access Review Committee and published these Guidelines.

The Access Review Committee

The Access Review Committee, consisting of City of Calgary department representatives and two members with disabilities from the community, was established by City Council to improve the access to City buildings and their environment. The terms of reference for the Access Review Committee are:

1. To implement the guidelines for City owned buildings and other facilities regarding the level of disabled access to be provided beyond that required by the Alberta Building Code, where it is practical and feasible to provide improved access;

2. To review plans for new City buildings or other facilities or major renovations to existing city buildings and facilities (excluding certain buildings such as pump stations and electrical substations, at the discretion of the committee); and to make recommendations regarding disabled access based upon the above City's guidelines;

3. To provide expertise to architects and other designers wishing consultation on disabled access for proposed City or private projects;

4. To encourage the owners of City-funded buildings to meet the requirements of the Access Design Guidelines.

ACCESS Design Guidelines

This document provides guidelines for accessibility. It is designed both as a working tool to provide a common point of reference and as a means to increase the awareness of the needs of people with disabilities. The guidelines recognize and address the heterogeneous nature of the population with disabilities within the categories of mobility, sensory and cognitive, as well as seniors. The range of their abilities and needs, even within each category, is broad and diverse. The guidelines also address winter climatic conditions, and makes the distinction between the more constant internal context and the more variable outdoor public context of the physical environment. While providing prescriptive details, the guidelines also discuss performance aspects. It is anticipated that design professionals, the building industry, government, and the community as a whole will take these ideas and go beyond them.

The guidelines will be monitored and updated as new technology or innovations become available. Formulation of the guidelines has been based primarily on:

1. the experience of people with disabilities from the community;

2. expertise acquired by City of Calgary departments through planning and construction of major projects; and

3. documentation of standards/guidelines by other provinces and countries.

Format of the Guidelines

This document consists of five principle chapters; General Design Considerations, Vehicular Access, Circulation, Public Facilities, and Communication. The chapters are divided into sections which deal with one particular area concerning access, and where appropriate distinguish between exterior and interior conditions. Each section has the following structure:

1. a statement of the principle/rationale behind making a particular area accessible;

2. a review of the Alberta Building Code 1990, in relation to each specific area of concern;

3. comments on any deficiencies or possible improvements pertaining to existing regulations; and

4. proposed guidelines to improve access.

The proposed guidelines in each chapter are highlighted by shading.

Use of the ACCESS Design Guidelines

The guidelines are used primarily as a basis for the review of City construction by the Access Review Committee. Examples where the guidelines have been applied in the past include Plus 15 bridges, Engineering Department buildings, LRT stations, and renovations to existing City buildings and parkade structures. The Access Review Committee, at its own discretion, may exercise a degree of flexibility in the application of the guidelines.

1.0 GENERAL DESIGN CONSIDERATIONS

1.1 BARRIER-FREE PATH OF TRAVEL

1.1.1 Principle/Rationale

A prerequisite to the issue of access is the freedom of movement. Barrier-free pathways allow the movement of people by minimizing hindrances, obstructions, and hazards.

1.1.2 Existing Regulations

1.1.2.1 Barrier-Free Path of Travel

Alberta Building Code 1990 3.7.1.3.(1)

"Except as permitted in Subsection 3.7.3., every barrier-free path of travel shall provide an unobstructed width of not less than 920 mm for the passage of wheelchairs."

Alberta Building Code 1990 3.7.3.2.(1).(f)

"Exterior walks that form part of a barrier-free path of travel shall be free from obstructions for the full width of the walk to a minimum height of 1980 mm, except that handrails are permitted to project not more than 100 mm from either or both sides into the clear area."

Alberta Building Code 1990 3.3.1.9.(3) and (4)

"(3) Except as provided in Sentence (4), obstructions located within 1980 mm of the floor shall not project more than 100 mm horizontally into exit passageways, public corridors, corridors used by the public or corridors serving classrooms or patients' sleeping rooms in a manner that would create a hazard for visually impaired persons travelling adjacent to walls.

(4) The horizontal projection of an obstruction in Sentence (3) is permitted to be more than 100 mm where it extends to less than 680 mm above the floor."

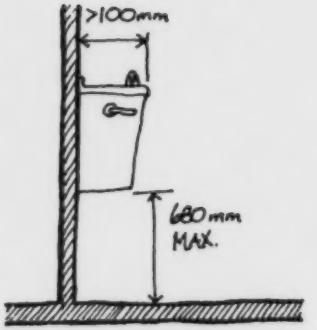
1.1.2.2 Areas Requiring Barrier-Free Access

Alberta Building Code 1990 3.7.2.1.(1)-(3)

"(1) Except as provided in Sentence (2), a barrier-free path of travel shall be provided.

a) into each suite,
b) into rooms or areas that serve the public or are designated for use by visitors, including areas in assembly occupancies with fixed seats, display areas and merchandising departments,
c) into rooms or areas for student use in assembly occupancies,
d) into general work areas, including office areas,
e) into general use or general service areas, including shared laundry areas in residential occupancies, recreational areas, cafeterias, lounge rooms, lunch rooms and infirmaries,
f) into outpatient facilities and sleeping rooms in hospitals and nursing homes,
g) into not less than one passenger-type elevator or elevating device conforming to Article 3.7.3.5.,
h) into washrooms described in Article 3.7.2.3.,
i) to any facility required by this Section to be designed to accommodate disabled persons,
j) onto every balcony provided in conformance with Sentence 3.3.1.7.(1), and
k) to all service counters used by the general public (see Appendix A)."

(2) Except as provided in Sentence (3), Sentence (1) does not apply to storeys above or below the first storey of a building that does not exceed 2 storeys in building height, where the storey does not exceed 600 m² in area.



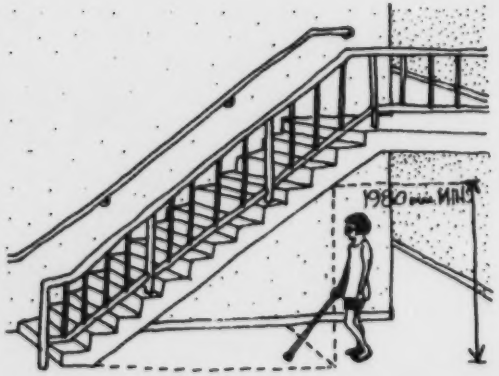
OBSTRUCTIONS PROJECTING MORE THAN 100mm FROM THE WALL CAN BE HAZARDOUS TO PEOPLE WHO ARE BLIND.

(3) Sentence (1) does not apply to storeys above or below the first storey in buildings of Group C occupancy which do not exceed 3 storeys in building height or 600 m² in building area and are not served by a passenger type elevating device."

1.1.3 Comments

The Alberta Building Code requires the horizontal projection of an obstruction to be less than 680 mm above the floor. People who are blind find this height to be above cane detection, and recommend a lower minimum of 255 mm to reduce the risk of collision with the obstruction.

Temporary hazards are often overlooked. Snow removal during Calgary's winter often results in snow banks along sidewalk curbs, which blocks access to and from crosswalks.



A BARRIER SHOULD BE USED TO PREVENT ACCESS TO THE STAIR OVERHANG AREA.

1.1.4. Proposed Guidelines

Free-standing or cantilevered staircases should be avoided or have a barrier to prevent access to the overhang area.[1]

Guy-wires near walkways should be clearly marked to at least 1980 mm above the ground.[2]

Temporary signs or parked vehicles should not block a path of travel.[3]

Wind buffers should be set back from the sidewalk in such a manner that the walk will still be protected from winds, yet the snow will be deposited next to the walk rather than covering the walk.[4]

Notes

1. CNIB, Access Needs of Blind and Visually Impaired Travellers in Transportation Terminals, 1987.
2. Communication from consumer groups.
3. Same as Note 1.
4. City of Sault Ste. Marie, Winter Cities Design Manual, 1990.

1.2 GROUND, FLOOR AND WALL SURFACES

1.2.1 Principle/Rationale

In concurrence to all climatic variants, surface texture, colour, tone and pattern should be used to complement the site and building, for example, by defining the spatial organization, thereby providing a greater level of understanding of the physical environment. The tactile quality of surfaces should be designed to support visual information regarding orientation, direction and location.[1]

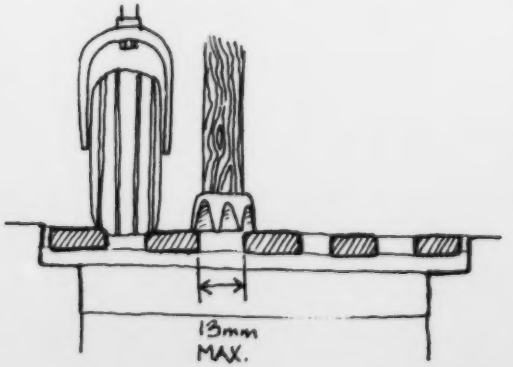
Surface materials of circulation routes should not impede pedestrian movement, particularly for those in wheelchairs, or distort the perception of people who are visually impaired. Likewise, wall surfaces should not distort perception or cause physical harm.

1.2.2 Existing Regulations

Alberta Building Code 1990 3.7.1.3.(2)

"Floor surfaces along a barrier-free path of travel shall have no opening that will permit the passage of a sphere more than 13 mm in diameter."

OPENINGS LARGER THAN 13mm MAY CATCH WHEELCHAIR WHEELS OR CANES, OR CAUSE PEOPLE TO TRIP.

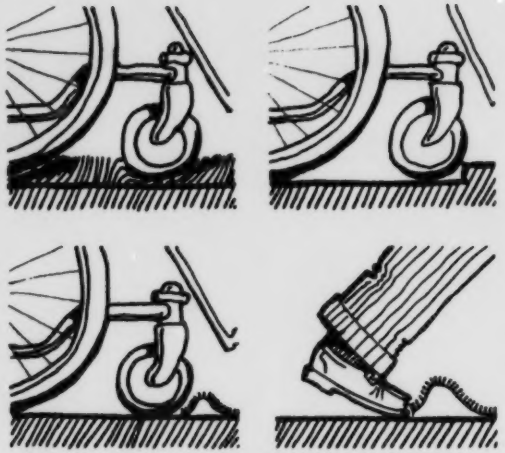


Alberta Building Code 1990 3.7.3.2.(1)(b)

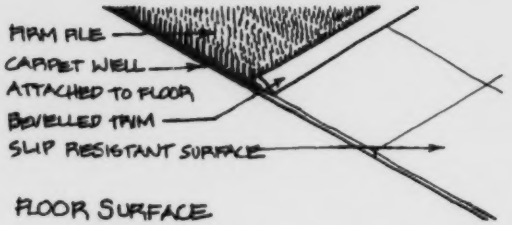
"Exterior walks that form part of a barrier-free path of travel shall have a permanent, firm and slip-resistant surface."

1.2.3 Comments

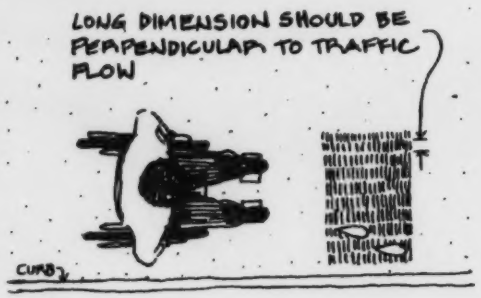
Since ground and floor surfaces are an important aspect of barrier-free design, they should be designed to ensure safe and easy movement. It is important that the freeze/thaw cycle and positive drainage be considered when designing ground surfaces. There should be a consistency of materials and colours in recurring situations to provide effective and accessible sensory information about the environment.



LOOSE OR THICK CARPETS OR UNEVEN SURFACES MAY CAUSE DIFFICULTY



ELECTRICAL VAULT GRATING



1.2.4 Proposed Guidelines

1.2.4.1 General Considerations

Non-visual sensory information should be used in conjunction with visual information. Visual perceptions can be confirmed, or distortion or absence of vision can be compensated for, by integrating all sensory information.[2]

There should be a balance between too soft/absorbent and too hard/reflective materials and surfaces. Some sound reverberation aids people who are blind by providing a sense of the size of the space and the location of walls or openings, while some sound absorption helps people who are hard of hearing by reducing background noise.[3]

1.2.4.2 Ground and Floor Surfaces

Outdoor floor and walk surfaces shall not have surfaces made of brick or stone, unless they are laid on a firm base and level with adjacent surfaces.[4]

Gratings, manholes and catch basins should be located outside of walkways wherever possible, otherwise they should be flush with the adjacent surface and the elongated openings should be perpendicular to the pedestrian flow.[5]

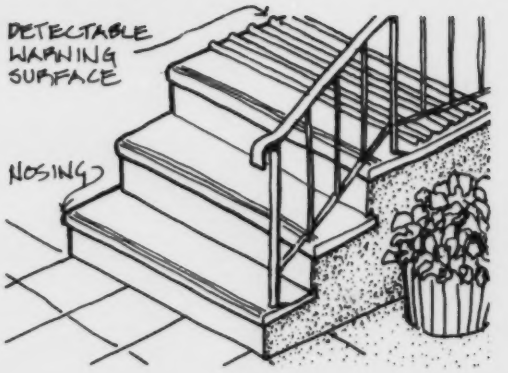
An electrical vault grating should have openings no larger than 20 mm x 90 mm to meet the ventilation requirements of the transformer, as well as, to prevent the front wheels of a wheelchair from falling through. Small solid plates, like footprints, placed in the direction of the pedestrian traffic and accommodating an average stride, allow women wearing high heels to safely cross over.[6]

Carpets that are laid on the floor, stairs or ramp surfaces should be securely attached. They should have a tight weave, low pile and firm underlay.[7]

Exposed edges of carpet shall be fastened to the floor surface with trim along the entire exposed edge. The carpet trim should be bevelled with a slope of no greater than 1 in 2.[8]

All floor finishes should be slip resistant, firm and stable. The floor surface should have a friction coefficient of no less than .5 wet or dry.[9]

Nosing on exterior stairs shall be provided with a contrasting colour to aid people with visual impairments. When feasible, interior stairs should also be provided with contrasting nosing.



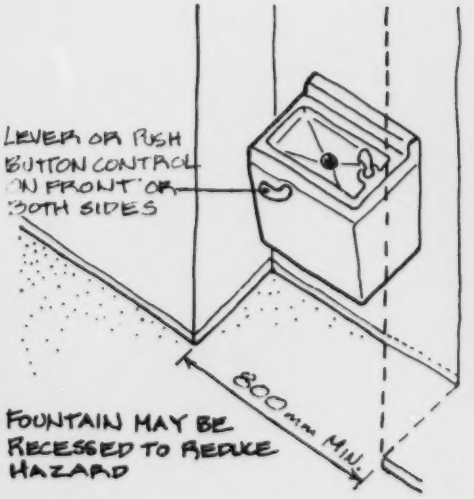
1.2.4.3 Wall Surfaces

Wall surfaces should not be extremely rough or uneven. They should be tactile without causing discomfort or injury.[10]

Sharp angles or junctions of finishes should be avoided and wall fixtures should be recessed as far as possible.[10]

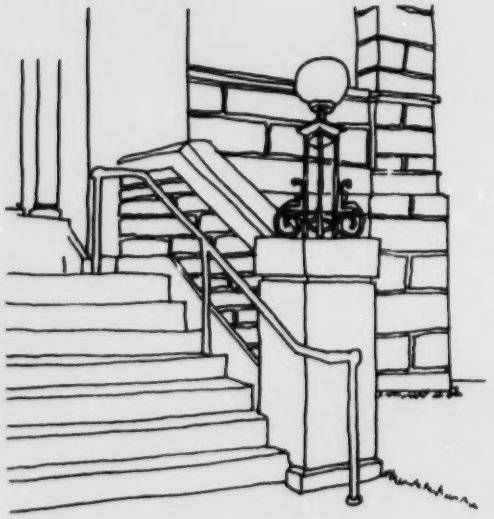
Wall surfaces should have a matte finish to prevent glare.[12]

Wall surfaces should not be entirely of mirror or glass, or there should be a horizontal warning strip, a minimum 130 mm wide and 1350 mm above the floor.[13]



Notes

1. CNIB, Access Needs of Blind and Visually Impaired Travellers in Transportation Terminals, 1987.
2. Same as Note 1.
3. Communication from consumer groups.
4. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.
5. Same as Note 3.
6. Same as Note 3.
7. Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, Public Buildings, 1986.
8. Same as Note 4.
9. Same as Note 4.
10. Thorpe, S., Designing for People with Sensory Impairments, 1986.
11. Same as Note 9.
12. Same as Note 1.
13. Same as Note 1.



1.3 ILLUMINATION AND ACOUSTICS

1.3.1 Principle/Rationale

Currently, there are no standards regarding the level and quality of illumination needed by people with visual impairments or of acoustics for people who are hard of hearing. High levels of illumination consistent throughout a setting, without creating glare, improve people's ability to see. The minimization of ambient noise and the reduction of the layering of different sounds improve people's ability to hear.

1.3.2 Existing Regulations

1.3.2.1 Minimum Lighting Requirements

Alberta Building Code 1990 3.2.7.1.(1)

"Every exit, public corridor and corridor providing access to exit for the public or serving patients' sleeping rooms or classrooms shall be equipped to provide illumination to an average level of not less than 50 lx at floor or tread level and at all points such as angles and intersections at changes of level where there are stairs or ramps."

1.3.3 Comments

Consistency in the levels of illumination is a primary concern for people with visual impairments, since their ability to adjust from one level to another is often slow. This is particularly important, when making the transition from the exterior to the interior.

1.3.4 Proposed Guidelines

1.3.4.1 Illumination

The level of illumination should be increased to emphasize stairs, entrances, obstacles, information signs, and hazardous areas.[1]

The minimum level of illumination on signs should be 200 lx.[2]

Controls and operating mechanisms should be capable of being illuminated to at least a level of 100 lx.[3]

Lights must be controlled and directed so that they do not create glare.[4]

Increased levels of illumination or a greater distribution of fixtures for outdoor lighting is important to people with visual impairments.[5]

Windows should be designed and located to prevent glare, especially in areas of circulation.[6]

1.3.4.2 Acoustics

Carpets or sound-absorbing materials should be used on floors to aid people who are hard of hearing.[7]

Background noise can be difficult for a hard of hearing person. When possible, switches should be installed to turn off noisy devices such as fans.[8]

The placement of speakers of public address systems should not be near crucial areas of communication, such as over an information or service desk.[9]

Notes

1. The City of Toronto, Planning & Development Department, Development Review Guidelines for a Barrier-Free Environment, 1981.
2. CSA Standard, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
3. Same as Note 2.
4. CNIB, Access Needs of Blind and Visually Impaired Travellers in Transportation Terminals, 1987.
5. Harris, C., and Dines, N., Time-Saver Standard for Landscape Architecture, 1988.
6. Communication from consumer groups.
7. Same as Note 6.
8. Same as Note 6.
9. Same as Note 6.

1.4 LOCATION OF CONTROLS, DISPENSERS AND RECEPTACLES

1.4.1 Principle/Rationale

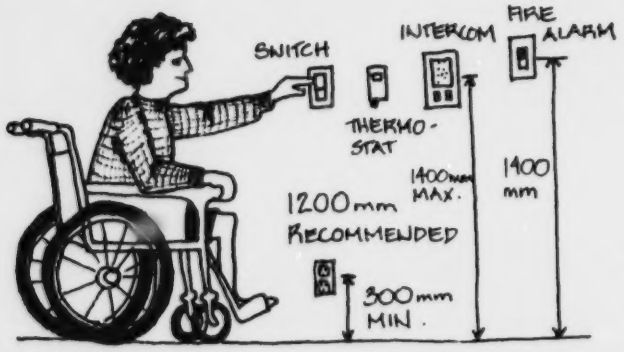
Controls should be convenient for everyone to use. However, controls often present two major problems for people with disabilities. First, controls are either too high, too low or too far away to reach, and second, some controls are too difficult to grasp and turn. Controls should require only one hand to operate without any twisting motion.

While emergency controls should not be placed too high for people in wheelchairs, they should not be too low, thereby preventing children from misusing them.

1.4.2 Existing Regulations

Alberta Building Code 1990 3.7.1.5

"Except as provided in Article 3.7.3.5 for elevators, controls for the operations of building services or safety devices, located in a barrier-free path of travel and intended to be operated by an occupant, including electrical switches, thermostats and intercom switches, shall be accessible to a person in a wheelchair and shall be mounted not more than 1400 mm above the floor."



LOCATION OF CONTROLS

1.4.3 Comments

Buildings used by the public should have controls at a height that can be reached by everyone without excessive stretching or bending. A maximum height of 1200 mm is more reasonable for people in wheelchairs.

1.4.4 Proposed Guidelines

1.4.4.1 Safety and Emergency Controls

Emergency controls such as fire alarms should be located with their highest operable parts 1400 mm above the floor (measured to their centres). This will prevent children from misusing them.[1]

1.4.4.2 Automatic Door Controls

The optimum height for automatic door controls is 800 mm above the floor surface.

1.4.4.3 Lighting Fixtures

The highest operable part of light switches and other non-emergency controls shall be 1200 mm above the floor.[2]

1.4.4.4 Electrical Outlets

Electrical outlets should be mounted at a minimum height of 300 mm measured from the floor to the centre line of the outlet.

1.4.4.5 Thermostats

Where adjustable thermostats or other devices have readable settings, they should be oriented in order to be readable by a person in a wheelchair.[3]

1.4.4.6 Breaker Panels

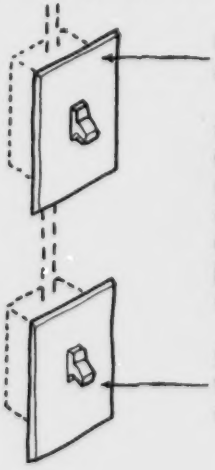
The base of a breaker panel should be 1200 mm above the finished floor surface. It should be installed in a horizontal position to allow easy reach for people with disabilities, particularly those in wheelchairs.[4]

1.4.4.7 Washroom Controls

In washrooms, dispensers and receptacles should be mounted with their highest operable part no more than 1200 mm above the floor surface.[5]

AUTOMATIC DOOR CONTROLS

Lowering Light Switches



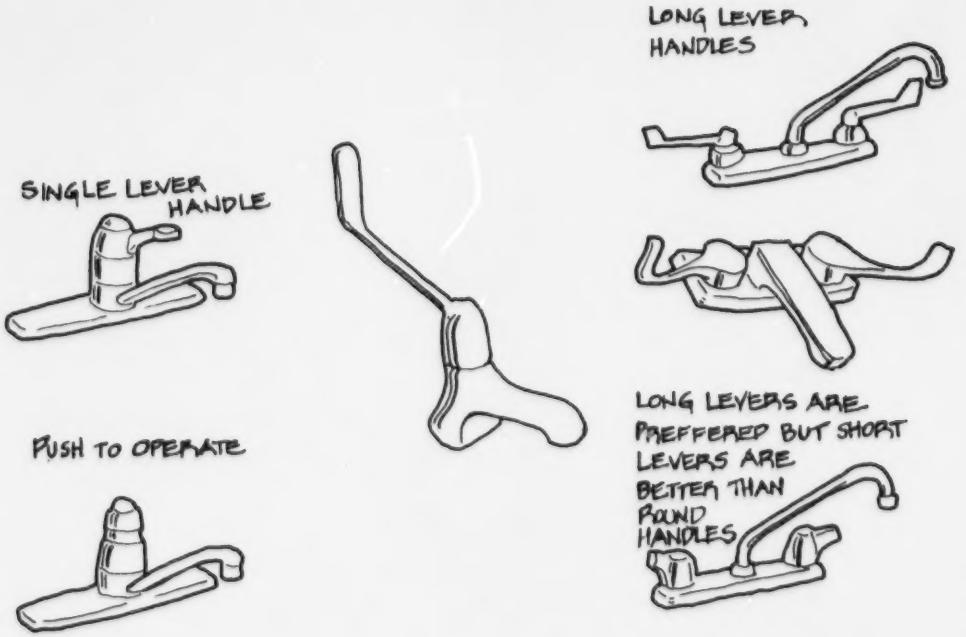
Existing wiring and switch

Switch may remain for dual control or be removed, but box must remain for junction and can be covered and patched to match existing wall.

New lower switch and wiring connected to existing switch box

Controls, dispensers and receptacles should not require the use of two hands, or two simultaneous movements by one hand to operate.[6]

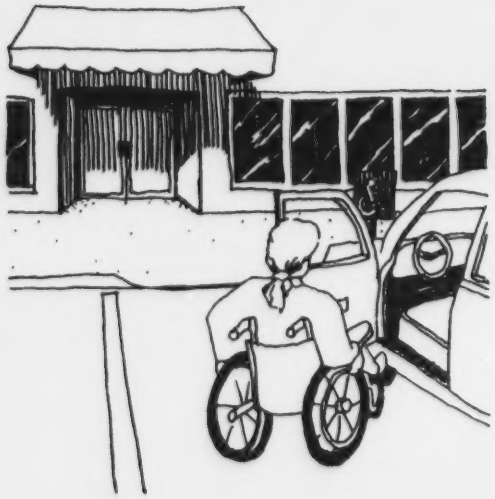
Controls should have a lever type action for easy operation.[7]



Notes

1. City of Calgary Planning & Building Department.
2. Same as Note 1.
3. Communication from User Groups.
4. Same as Note 3.
5. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.
6. Same as Note 4.
7. Calgary Action Group of the Disabled.

2.0 VEHICULAR ACCESS



2.1 PARKING

2.1.1 Principle/Rationale

Since non-ambulatory and semi-ambulatory individuals have limited mobility, parking stalls within parking lots should be located as close as possible to a main accessible entrance and provide enough space to get in and out of a vehicle.

Parking lots are primarily designed for vehicles in terms of efficiency and accessibility, but consideration should be given to create better and safer conditions for pedestrians, particularly in winter, when icy parking lots become treacherous.

Street parking should also be made wheelchair accessible, since in some areas of the city this is the only type of parking available. However, current city policy does not allow for midblock ramps, therefore, accessible parking should be located at either end of a street.

2.1.2 Existing Regulations

Alberta Building Code 1990 3.7.2.1.(4)

"A barrier-free path of travel shall be provided from the entrance described in Article 3.7.1.2. to

a) an exterior parking area, where exterior parking is provided (see Appendix A), and

b) at least one parking level, where parking is provided in a parking structure, where it is served by a passenger elevator."

Alberta Building Code 1990 A-3.7.2.1.(4)(a) - Access to Exterior Parking

"The designer may choose to designate the entrance leading to the exterior parking area as the required entrance which is wheelchair accessible. The entrance chosen should, in any case, be one normally used by the occupants of the building. Long paths of travel are not recommended."

Alberta Building Code 1990 3.7.2.4.(1) - (3)

"(1) Except as provided in Sentence (2), where on-site parking will be provided pursuant to the Planning Act, one parking stall for disabled persons shall be provided for each dwelling unit required in Sentence 3.7.1.1. (4) and for each viewing position in assembly occupancies required in Article 3.7.2.2.

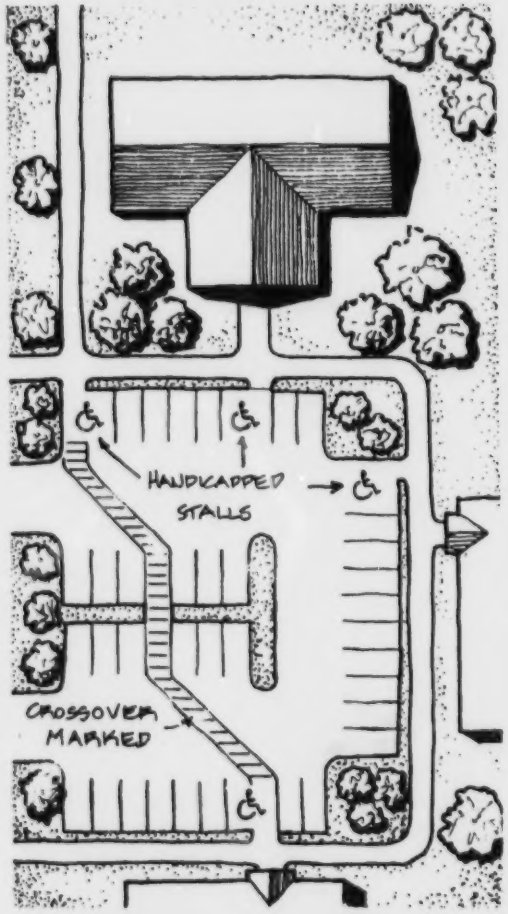
(2) Where on-site parking will be provided pursuant to the Planning Act, and more than 50 stalls are required, parking stalls for use by disabled persons shall be provided in the ratio of 1 for every 100 or part thereof.

(3) Stalls in Sentences (1) and (2) shall

- *a) be at least 3.7 m wide,*
- *b) have a firm, slip-resistant and level surface,*
- *c) be located close to an entrance required to conform with Article 3.7.2.1., and*
- *d) be clearly marked as being for the use of disabled persons only."*

Alberta Building Code 1990 A-3.7.2.4.(3)

"Parking stalls for use by disabled persons should be identified with the international symbol of access and should include the words "Permit Required." Requiring disabled persons to pass behind vehicles that would normally back out of a space should be avoided. Asphalt, concrete or firm gravel are acceptable parking surfaces. Curb cuts should be at least 920 mm wide. Parallel parking stalls should be 7000 mm in length."



When crossover cuts or ramps are provided, the pathway to and from the ramps should be marked in a contrasting manner (such as yellow hash marks), so that drivers are aware of wheelchair and pedestrian traffic.

Calgary Land Use By-law Section 18.1(k)

"A minimum of one parking stall having a minimum width of four (4) metres, shall be provided for the handicapped in all parking areas or structures, and shall be clearly designated as such, and located close to building entrances."

2.1.3 Comments

The Alberta Building Code minimum width of 3700 mm for a disabled parking stall is less than the 4000 mm required by the Calgary Land Use By-law. To facilitate moving from a vehicle to a wheelchair or mobility aid, the 4000 mm minimum width is preferred. The wider width allows for the length of a lift of a vehicle and the turning space of a wheelchair as it disembarks.

Alternate provisions for pedestrians and people in wheelchairs should be considered, instead of forcing them into areas designed for vehicular traffic and water drainage.

2.1.4 Proposed Guidelines

2.1.4.1 Signage

Parking stalls for people with disabilities should be identified with the international symbol of access and should include the words "Permit Required".[1] The international symbol of access should be posted on a vertical sign and also painted in blue on the ground to aid in clearly identifying the stall.

2.1.4.2 Ratio

A higher ratio of stalls should be provided for areas of higher concentrated use by individuals with mobility impairments such as health service facilities, hospitals, senior citizen complexes, recreational facilities, and homes for people with disabilities. Recommended parking stall ratios will be set on an individual basis by the Access Review Committee in consultation with the Planning & Building Department.

Parking stalls should be distributed throughout a parking lot to provide a choice of locations and the shortest travel distance to each entrance.[2]

2.1.4.3 Specifications

If two adjacent parking spaces are to be designated for people with disabilities, the total width of both spaces shall be 6800 mm, including a 1500 mm wide access aisle separating the two stalls.[3] The aisle should be clearly marked in blue.

Pedestrian access through a parking lot and to a building entrance should be safe. Where pedestrian walks cross vehicular routes, there should be contrast of colour and texture.[4]

In gravel parking lots, there should be parking for people with disabilities adjoining a hard surface. If there is no hard clear surface leading to a main sidewalk, a paved surface should be provided from the designated parking stall to the sidewalk.[5]

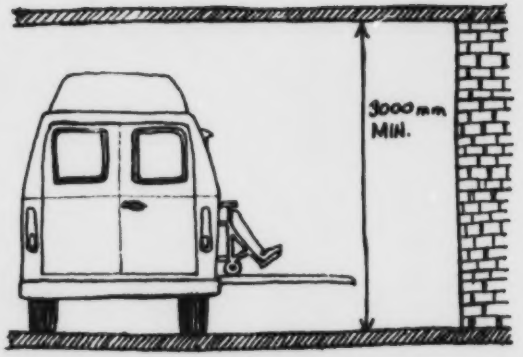
Parking blocks or wheelstops should be set back so that vehicles do not overhang to reduce the clear width of accessible routes.[6] Clearance between the wheelstops should allow a wheelchair to pass between. In addition, they should be colour contrasted from the paving material so they are not a hazard, particularly to people with visual impairments.

Sidewalk curb cuts should be provided to the main path of travel.[7] Drainage should be designed to prevent puddles or ice build up at the bottom of the curb cut. Parking surfaces should be sloped 1:50 for drainage.[8]

2.1.4.4 Parkades

Multi-level parkades should provide parking stalls for people with disabilities on each level, adjacent to accessible elevators. Where elevators are not provided, designated parking should be provided at grade.

Minimum vertical clearance is 3000 mm to allow vans access.[9]



VERTICAL CLEARANCE

VEGETATION PROVIDES WIND PROTECTION AND CONTROLS DRIFTING SNOW IN PARKING LOTS.

2.1.4.5 Street Parking

Where designated parking stalls are provided on the street, parking meters should be a maximum height of 850 mm, and should not require twisting or pinching of the wrist to operate.

Street parking stalls for people with disabilities should be located as close as possible to sidewalk curb cuts, to provide easy maneuverability and safety from street to sidewalk.

Parking meters should be placed at either end of street parking stalls with no obstructions in front or to the side of the coin slot on the meter, and preferably in a well-lit and protected area.

2.1.4.6 Winter Conditions

A large parking lot should be divided with vegetation into smaller sections which are still efficient for snow removal, yet provide wind protection and control drifting snow.[10]

Notes

1. Harkness, Sarah P. and Groom, James N.; Building Without Barriers for the Disabled, 1976.
2. City of Calgary, Planning & Building Department.
3. U.S. Department of Transportation, 1980.
4. Communication from consumer groups.
5. Same as Note 2.
6. Robinette, Gary O., Barrier-Free Exterior Design: Anyone Can Go Anywhere, 1985.
7. Same as Note 6.
8. Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, 1986.
9. Calgary Handi-Bus Association
10. Winter Cities Association and City of Sault Ste. Marie, Winter Cities Design Manual, 1990.

2.2 LAY-BYS

2.2.1 Principle/Rationale

Lay-bys are roadside drop-off areas, separate from the flow of vehicular traffic. They are usually located in front of buildings on busy streets and their main function is to allow passengers to get in and out of vehicles safely and conveniently. They are especially beneficial for people who have a mobility limitation, who have children in strollers, who are carrying bulky packages, or who are senior.

2.2.2 Existing Regulations

The Alberta Building Code 1990 has no requirements for lay-bys in front of buildings.

2.2.3 Comments

The provision of lay-bys should be encouraged, especially where streets are narrow or where there is a steady flow of traffic.

The City's standards require that the minimum width of the sidewalk behind the lay-by be at least 3000 mm to maintain smooth pedestrian movement.

2.2.4 Proposed Guidelines

Lay-bys should be provided, close to main entrances of buildings. They should have a minimum width of 3700 mm and a minimum length of 7600 mm.

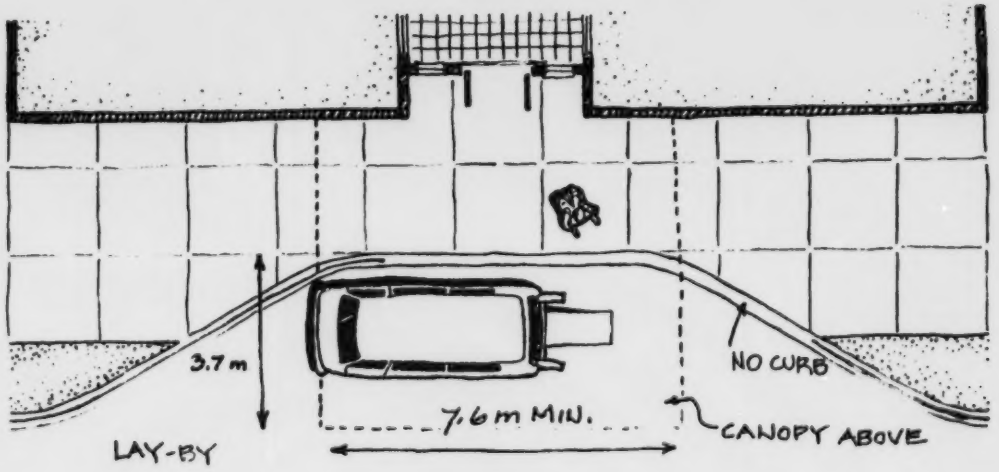
It is recognized that it may not be reasonable to provide lay-bys in many downtown sites where competing interests for land may render lay-bys nonfunctional or beyond reasonable cost.

A curb maintains a separation between vehicles and pedestrians for their safety and proper drainage.[1]

Where lay-bys are provided, curb cuts should be placed in the lay-by for wheelchair access. The slope of the curb cut shall not exceed 1 in 12.[2]

The curb should be a roll curb to allow a Handi-Bus to back onto the sidewalk, and then lower its ramp directly onto the sidewalk to unload passengers.[3]

Building entrances adjacent to lay-bys should be covered where possible, to provide shelter from precipitation, and keep the sidewalk free of snow and ice. The minimum clearance of a covering should be 3000 mm from the ground.



Notes

1. City of Calgary, Engineering & Environmental Services Department, Street Division.
2. Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, Public Buildings, 1986.
3. Same as Note 1.
4. Same as Note 1.

2.3 LIGHT RAIL TRANSIT (LRT)

2.3.1 Principle/Rationale

Non-ambulatory and semi-ambulatory people should not have to rely solely on specialized transportation services for travel. Having an accessible public transit line would relieve the burden on those services. With changing demographics and increasing numbers of people with disabilities those services are being stretched to their limit. With an accessible LRT line, people with disabilities and seniors will have alternative means of travel. Self-reliant wheelchair users will benefit especially from an accessible LRT as an independent means of transportation.

2.3.2 Existing Regulations

Currently, there are no written guidelines addressing LRT accessibility.

2.3.3 Comments

The City of Calgary has recognized the needs of the disabled community concerning public transit and has implemented structural changes to accommodate them. These changes include modification to LRT vehicles to accommodate wheelchairs and decals to indicate which ones have been modified. Handrails in all stations (except on the South line) are reduced in diameter where required. Elevators, including exterior ones, are installed where required. Features to ensure safety and convenience include protruding call buttons linked to the transit system, red protruding emergency call buttons and glass walls to increase visibility. With an accessible LRT system, the self-reliant wheelchair user need not be dependant upon Handi-Buses, taxis, or private means of transportation.

2.3.4 Proposed Guidelines

While certain requirements (listed below) should be emphasized concerning accessibility to the LRT, they are discussed in other sections of the Guidelines and reference should be made to these sections.

2.3.4.1 Ramps

It should be noted that long ramps require a physical exertion beyond the capability of many people, including those in wheelchairs. In addition, the ramps are fully exposed to the weather and become particularly hazardous when covered with snow and ice. Installation of elevators is a solution. Refer to Section 3.3.

2.3.4.2 Handrails: Refer to Section 3.4.

2.3.4.3 Public Telephones

A pay telephone should be mounted on walls or in an enclosure in such a way as to allow access from a wheelchair, yet be detectable by a cane.[1] Refer to Section 5.1.

2.3.4.4 Elevators

Climatic variations should be considered in the placement of exterior elevators. In Calgary, the orientation should be away from the prevailing winds and blowing snow. Alternately, a vestibule should be added to keep the car free of snow, rain, and debris. Refer to Section 3.9.

2.3.4.5 Doors and Doorways: Refer to Section 3.7.

2.3.4.6 Announcements

Devices providing visual and audible announcements of delay of service or emergency situations should be used.[2] Refer to Section 5.3.

2.3.4.7 Transit Shelters

Transit shelters should serve as drop-off points in an accessible transit system.[3] They provide protection from wind and cold, especially for seniors and people with mobility problems. They also serve as rest stations, so there should be benches. Shelters should be set back from the curb to allow sufficient space for pedestrian circulation and drifting snow.

Notes

1. Calgary Disabled Access Review Committee.
2. Communication from consumer groups.
3. Winter Cities Association and City of Sault Ste. Marie, Winter Cities Design Manual, 1990.

3.0 CIRCULATION

STREET FURNITURE SHOULD BE LOCATED WITHIN A DEFINED ZONE ALONG THE OUTER EDGE OF WALKWAYS.

3.1 EXTERIOR WALKWAYS

3.1.1 Principle/Rationale

People want to be able to move throughout a city safely, conveniently, and independently. Exterior pathways and sidewalks that are not free of obstacles or hazards makes movement more difficult. When there is a conflict between vehicular and pedestrian traffic, a pedestrian right-of-way should take precedence, promoting the notion of access to the outdoors.

3.1.2 Existing Regulations

Alberta Building Code 1990 3.7.3.2.(1)

"Exterior walks that form part of a barrier-free path of travel shall

a) be provided by means of a continuous plane not interrupted by steps or abrupt changes in level,

b) have a permanent, firm and slip-resistant surface,

c) have a minimum uninterrupted width of 1100 mm, and a gradient not exceeding 1 in 20,

d) have a minimum 75 mm high curb where, in the absence of walls, railings, or other barriers on either or both sides of the walk, the vertical drop from the walk exceeds 75 mm,

e) have a minimum 1100 mm wide surface of a different texture to that surrounding it, where the line of travel is level and even with adjacent walking surfaces,

f) be free from obstructions for the full width of the walk to a minimum height of 1980 mm, except that handrails are permitted to project not more than 100 mm from either or both sides into the clear area,

g) be designed as a ramp where the gradient of the walk is greater than 1 in 20, and

OUTDOOR WALKWAYS

h) have a level area adjacent to the entrance doorway conforming to Clause 3.7.3.4.(1)(c)."

Alberta Building Code 1990 8.2.5.1.(4)

"Where construction operations necessitate the obstruction of the sidewalk a temporary sidewalk shall be provided where necessary, and it shall be kept clear of obstruction at all times."

3.1.3 Comments

While the Alberta Building Code requires a minimum width of 1100 mm for exterior walkways, the practice of placing lamp posts, traffic-light-signal posts, transformers, mailboxes, newspaper boxes, trash containers, bus shelters, cross ramps, and other obstacles greatly reduces the barrier-free path of travel.

Snow removal practices often clear the street, but block curbs with snow banks, making it difficult or impossible to cross the street.

PRUNE TREE BRANCHES OVERHANGING WALKWAYS TO AVOID CREATING HAZARDS.

3.1.4 Proposed Guidelines

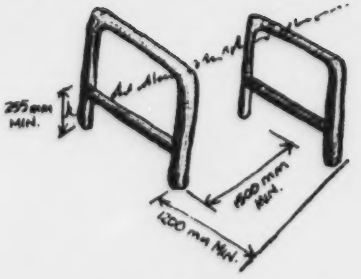
3.1.4.1 Pathways

Pathways should have a hard packed surface, complementing the park or surrounding aesthetics.

Pathways, should follow the contours of the land[1] with its edges clearly defining the route.

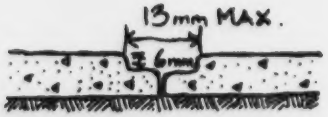
There should be rest areas at regular intervals. Where the gradient is steeper, rest areas should be placed closed together.[2]

Maze gates should have a minimum width of 1200 mm and a minimum clearance of 1500 mm to allow passage of wheelchairs, as well as adapted or tandem bicycles used by persons with physical disabilities or visual impairments.



MAZE GATES

CONIFEROUS TREES PROVIDE BUFFER TO COLD NORTHWEST WINDS AND HELP PREVENT SNOW DRIFTING ONTO PATHWAYS



SIDEWALK JOINT

Pathways should be designed to drain water to avoid puddles and ice build-up. They should also be maintained clear of snow and ice in winter.[3]

Plant materials should be used to minimize the adverse effects of the weather, such as wind, glare, and temperature.[4] Plants should be regularly pruned to avoid becoming a hazard.

3.1.4.2 Sidewalks

Where there are likely to be many people using mobility aids, the minimum width of a sidewalk should be 1500 mm.[5]

Gratings, manholes covers, electrical vaults, and other access covers should be placed adjacent to walkways unless prevented by site constraints. If this does occur, the gratings should have a maximum clear opening of 13 mm, although, due to the ventilation requirements, the gratings on electrical vaults may be larger. The long dimension of the openings should lay perpendicular to the path of travel. (Refer to Section 1.2.)

Joints in sidewalks or between bricks and stones should not exceed 13 mm in width and 6 mm in depth, and should be flush with the adjoining surface.[6]

A level surface should be maintained behind cross ramps for smooth pedestrian and wheelchair travel.

Street furniture, including trees and lamp posts, should be located within a defined zone along the outer edge of walkways, leaving a clear path of travel.[7]

Sidewalks should be designed to drain water to prevent puddles and ice build-up.

Notes

1. Canadian Parks/Recreation Association, Getting It Built Accessible, 1983.
2. Ries, M., Design Standards to Accommodate People with Physical Disabilities in Park and Open Space Planning, 1973.
3. Same as Note 1.
4. Harris, C., and Dines, N., Time-Saver Standard for Landscape Architecture, 1988.
5. Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, Public Buildings, 1986.
6. Communication for consumer groups.
7. Same as Note 4.

3.2 SIDEWALK CURB CUTS

3.2.1 Principle/Rationale

Curb cuts should be installed at corners and other appropriate locations to ease movement from sidewalk to street by minimizing the changes in grade.

3.2.2 Existing Regulations

There are no provisions in the Alberta Building Code relating to curb cuts.

3.2.3 Comments

In Calgary, sidewalks are constructed with curb cuts in developing residential areas of the city. Curb cuts are also constructed when curb and gutter work is undertaken in existing sidewalks, or when they are replaced.

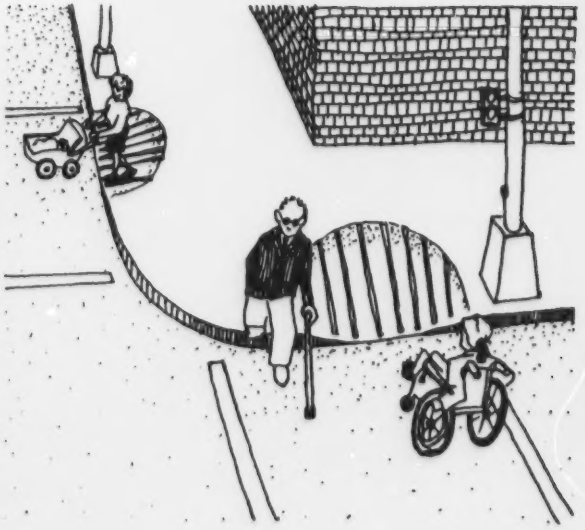
In designing curb cuts, care should be taken to prevent them from becoming hazards to people with visual impairments, who may not notice them and walk inadvertently into the intersection. Curb cuts located right on the corner should be avoided, because they force people using wheelchairs and people pushing strollers into the intersection, rather than the safe area of the crosswalk.

The requirements in CAN/CSA-B651-M90, Barrier-Free Design, are included in Section 3.2.4.

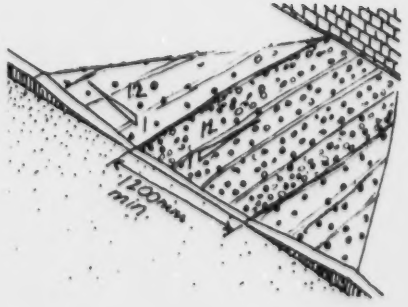
3.2.4 Proposed Guidelines

3.2.4.1 Specifications

The minimum width of curb cuts, exclusive of flared sides shall be 920 mm, or 1200 mm where exposed to snow.[2]



TYPICAL CURB CUT WITH FLARED SIDES IN A CONTRASTING TEXTURE.



The slope of a curb cut should not exceed 1 in 12 unless sidewalk constraints do not allow construction at this ratio.[3]

The edges should be curved rather than cut sharply so all four wheels of a wheelchair maintain contact with the ground at all times.[4]

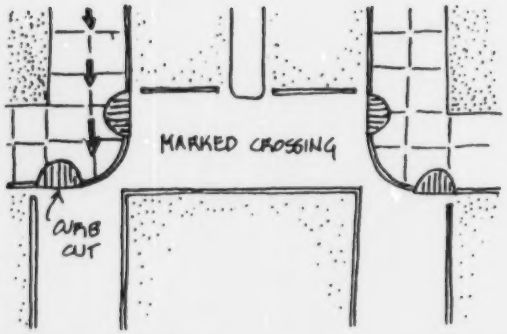
The bottom of corner curb cuts shall have a clear area not less than 1200 mm long within the crosswalk area.[5]

Surfaces of curb cuts shall be slip resistant.[7]

Curb cuts should contrast in texture from the surrounding sidewalk, so they can be identified by the visually impaired.[8] A raised texture is more perceptible.[9]

Drainage should be designed to prevent water and snow accumulating at the bottom of the curb cut, however, the catch basin should not be located in front of the curb cut.[6]

3.2.4.2 Location and its Factors



OFFSET CURBCUTS

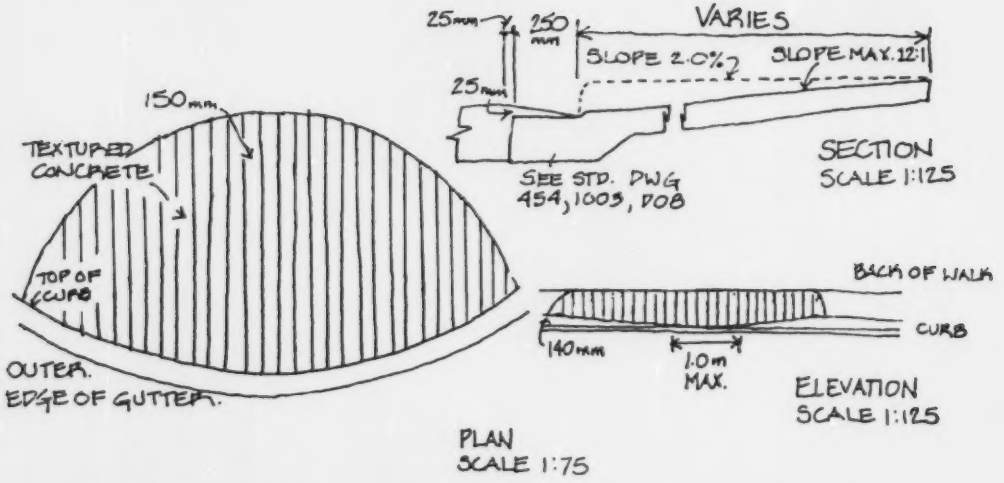
Where walks cross over parking lots, driveways or streets, the sidewalk should be cut to blend into a common level.[1]

Where possible, crosswalks should be elevated to the height of the sidewalk.

Where the width of sidewalks provide adequate space, curb cuts should be offset from the main flow of pedestrian traffic, yet still within the crosswalk area. The corner curb is maintained as a clearly defined edge and is cane detectable.[10]

A level area should be provided behind the curb cut to maintain an even pedestrian surface.

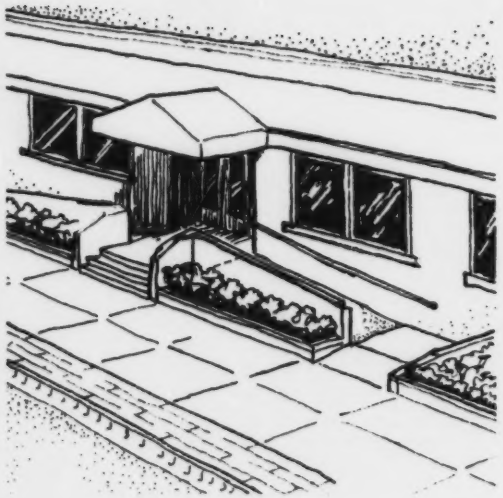
Raised islands in crossings shall be cut through level with the street; or have curb cut at both sides and a level area not less than 1200 mm long in the middle.[11]

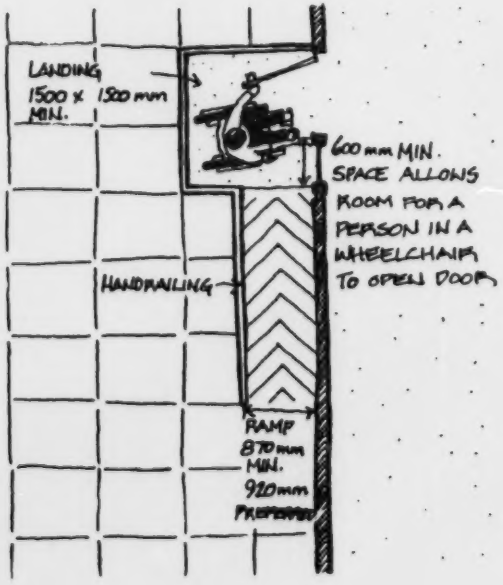


CURVED FORM HELP ALL 4 WHEELS OF A WHEELCHAIR MAINTAIN CONTACT WITH THE GROUND AT ALL TIMES.

Notes

1. The Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.
2. CSA Standard, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
3. Same as Note 2.
4. Streets Division, City of Calgary.
5. Same as Note 2.
6. Communication from consumer groups.
7. Same as Note 2.
8. Mace, R., and Iaslett, B., An Illustrated Handbook of the Handicapped Section of the North Carolina State Building Code.
9. Communication from consumer groups.
10. Same as Note 9.
11. Same as Note 2.





3.3 RAMPS

3.3.1 Principle/Rationale

For relatively small changes in levels, ramps are essential in providing an easier and often safer means of ascent and descent for people who are unable to use stairs.

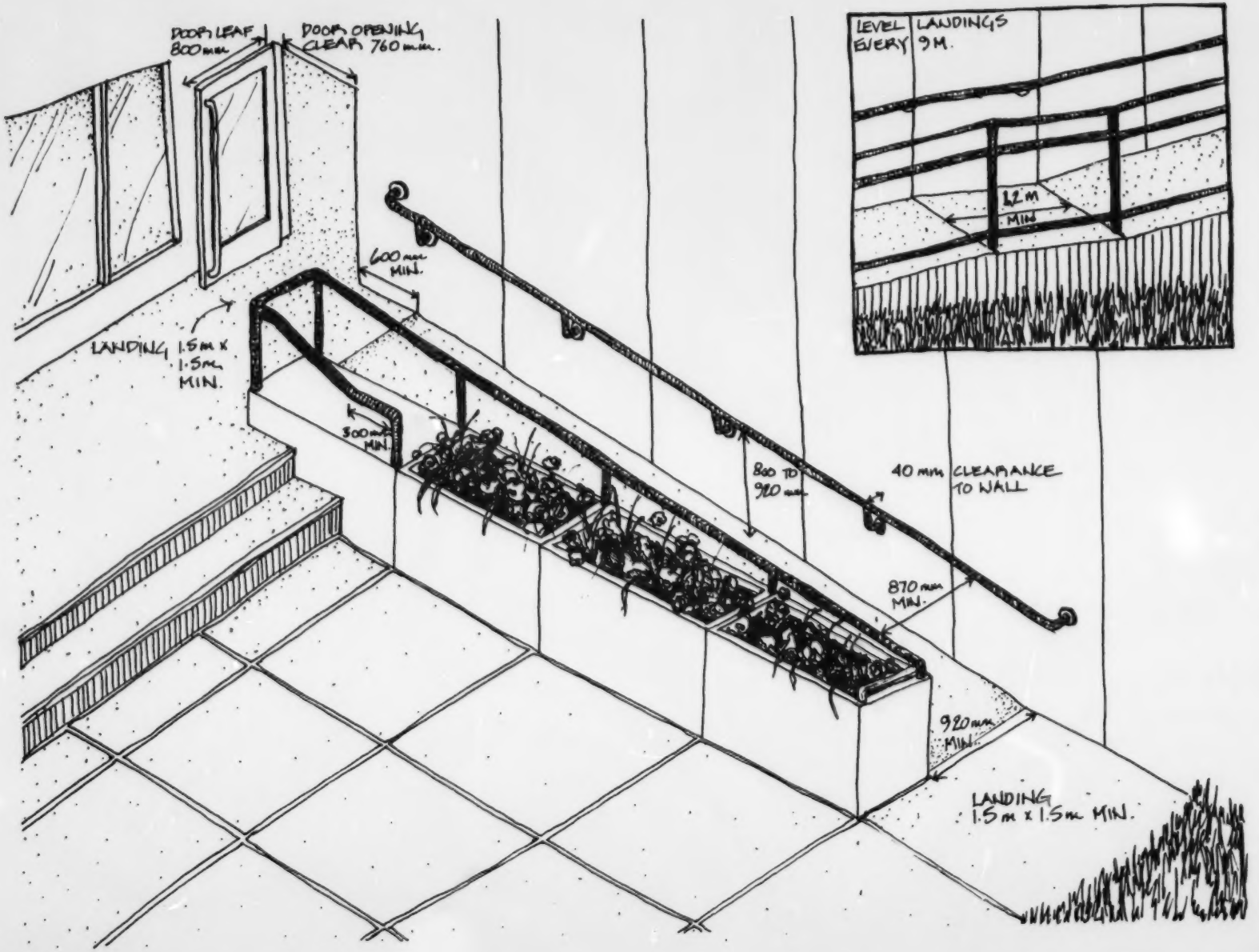
3.3.2 Existing Regulations

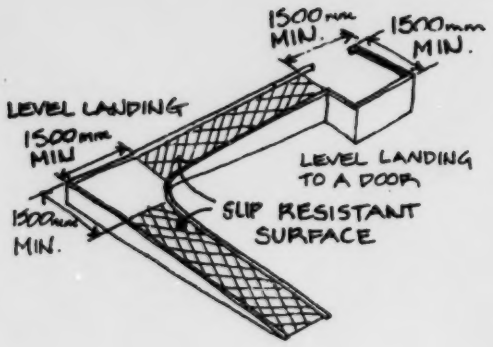
Alberta Building Code 1990 3.7.3.4.(1) and (3)

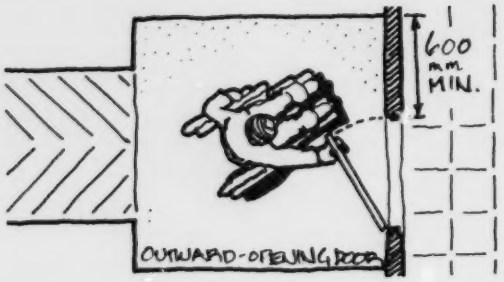
"(1) Ramps located in a barrier-free path of travel shall

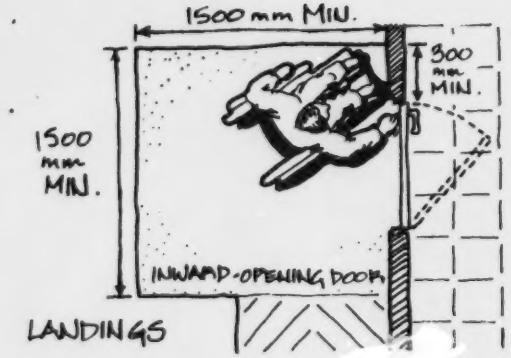
- *a) have a width of not less than 870 mm between handrails,*
- *b) have a gradient of not more than 1 in 12,*
- *c) have a level area not less than 1500 by 1500 mm at the top and bottom and at intermediate levels of a ramp leading to a door, so that the level area extends not less than 600 mm beyond the latch side of the door opening, except that where the door opens away from the ramp, the area extending beyond the latch side of the door opening may be reduced to 300 mm (see Appendix A),*
- *d) have a level area not less than 1200 mm long and at least the same width as the ramp,*
  - *i) at intervals of not more than 9 m along its length, and*
  - *ii) where there is an abrupt change in the direction of the ramp.*
- *e) except as provided in sentence (2) be equipped with handrails and guards conforming to Articles 3.4.7.5. and 3.4.7.6.,*
- *f) have a slip-resistant, continuous and even surface, and*
- *g) have walks, railings or other barriers that extend to within 75 mm of the finished ramp surface or a 75 mm high curb.*

(2) Where a ramp serves as an aisleway for fixed seating, the requirement for handrails in Clause 3.7.3.4.(1)(e) need not apply.


DOOR LEAF 800 mm
DOOR OPENING CLEAR 760 mm.
600 mm MIN.
LANDING 1.5m x 1.5m MIN.
300 mm MIN.
800 TO 920 mm
40 mm CLEARANCE TO WALL
870 mm MIN.
920 mm MIN.
LANDING 1.5m x 1.5m MIN.
LEVEL LANDINGS EVERY 9M.
1.2 M MIN







(3) Floor or walks in a barrier-free path of travel having a slope steeper than 1 in 20 shall be designed as ramps."

3.3.3 Comments

The requirements for ramps in CAN/CSA-B651-M90, Barrier-Free Design, (see Section 3.3.4) exceeds those of the Alberta Building Code. The minimum clear width in the CSA Standard is wider and accommodates all sizes of wheelchairs. Similarly, the dimensions of a level area are longer, which is important at corners and switchbacks.

Changes in levels should be limited as slopes require greater physical exertion and skill from people with disabilities. If ramps are too steep or too long, they become obstacles. Slopes between 1:15 and 1:20 are recommended.[1]

Climatic variations should be considered in designing exterior ramps to prevent them from being unusable in adverse conditions. Ramps should be maintained free of snow and ice.

3.3.4 Proposed Guidelines

The minimum clear width of a ramp should be 920 mm between handrails.[2]

Where passing of wheelchairs is likely to occur frequently, the minimum clear width should be 1525 mm.[3]

Ramps shall have level landings at the top and bottom of each run and also where the ramp changes direction. The landing shall be at least as wide as the widest ramp run leading to it, and have a length not less than 1500 mm.[4] The 1500 mm accommodates the length of a wheelchair as it negotiates a corner.

Visual and textural cues at the top and bottom of the ramp should be provided for people with visual impairments. Non-glare materials should be considered.[5]

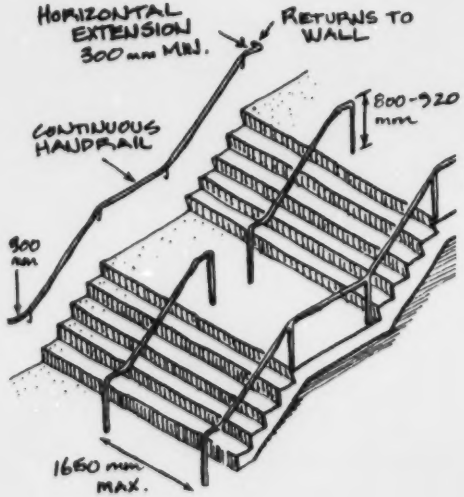
The maximum cross slope of ramp surfaces should be 1:50.[6]

Exterior ramps should be protected from rain, snow, and ice, or maintained free of snow and ice by appropriate sub-surface heating and drainage systems.[7]

If a ramp needs to be longer than 18 m then a mechanical means of ascent and descent should be used.[8]

Notes

1. Canadian Standards Association, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
2. Same as Note 1.
3. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.
4. Same as Note 1.
5. CNIB, Access Needs of Blind and Visually Impaired Travellers in Transportation Terminals, 1987.
6. Same as Note 1.
7. Same as Note 5.
8. Communication from consumer groups.



3.4 HANDRAILS AND GUARDS

3.4.1 Principle/Rationale

Handrails are important features in barrier-free access. They should be easy to grasp and provide a firm and comfortable grip.[1] People with visual impairments use handrails as guides. People with mobility impairments use them for leverage to get up ramps and the semi-ambulatory use them for balance on stairs or walkways. It is important that handrails be placed at a height that is convenient for everyone.

3.4.2 Existing Regulations

3.4.2.1 Handrails

Alberta Building Code 1990 3.4.6.4.(1), (2) and (3)

"(1) Every exit ramp or stairway shall have a handrail on at least one side and where 1100 mm or more in width, shall have handrails on both sides.

(2) Where the required width of a ramp or flight of stairs is more than 2200 mm, one or more intermediate handrails continuous between landings shall be provided, and the number and position of these intermediate handrails shall be such that there will be not more than 1650 mm between handrails.

(3) Handrails shall be constructed so that there will be no obstruction on or above them which will break a hand hold (see Appendix A)."

Alberta Building Code 1990 A-3.4.6.4.(3)

"Handrails should be easy to grasp. A circular section with a diameter of not more than 40 mm is the preferred shape. Wide or deep handrails are undesirable unless a proper hand-sized grasping area is provided."

Alberta Building Code 1990 3.4.6.4.(4) and (5)

"(4) Handrails on stairs and ramps shall be not less than 800 mm and not more than 920 mm high, measured vertically from a line drawn through the outside edge of the stair nosing or from the surface of the ramp, except that handrails not meeting these requirements are permitted provided they are installed in addition to the required handrail.

(5) At least one handrail shall be continuous throughout the length of the stairway, including landings, except where interrupted by doorways or newels at changes in direction (see Appendix A)."

Alberta Building Code 1990 A-3.4.6.4.(5)

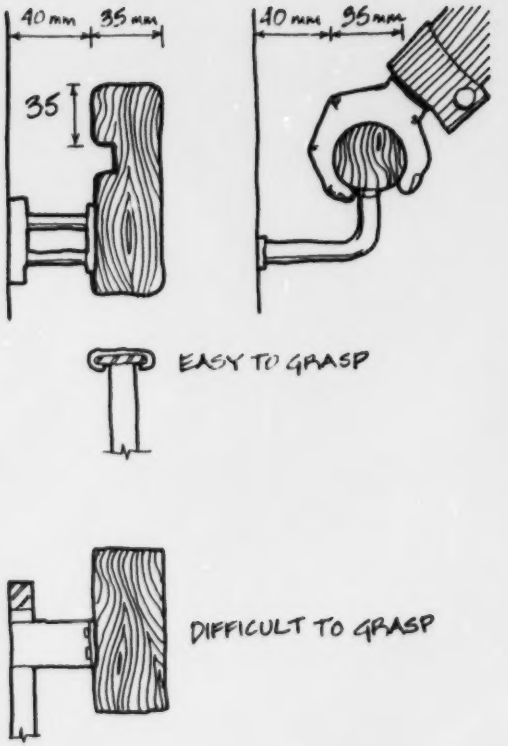
"Blind or visually impaired persons rely on handrails to guide them on stairways. A continuous handrail will assist them in negotiating stairs at changes in direction. The extended handrail is useful to persons with physical limitations to steady themselves before using the stairs. Handrails should however, return to the wall, floor or post, so as not to constitute a hazard to blind or visually-impaired persons."

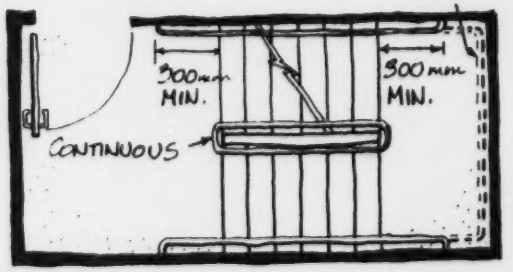
Alberta Building Code 1985 3.4.6.4.(6), (7), and (8)

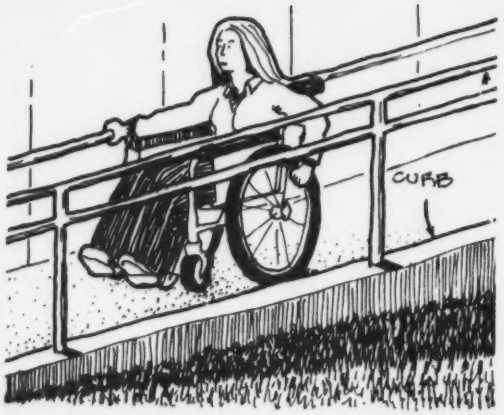
"(6) Handrails shall be terminated in a manner which will not obstruct pedestrian travel or create a hazard.

(7) At least one handrail at the sides of a stairway or ramp shall extend horizontally not less than 300 mm beyond the top and bottom of the stairway or ramp.

(8) A clearance of not less than 40 mm shall be provided between every handrail and any wall to which it is fastened."







3.4.2.2 Guards

Alberta Building Code 1990 3.4.6.5.(1)-(4)

"(1) Every exit such as a ramp, stairway or passageway shall have a wall or a well-secured guard on each side.

(2) The height of guards on exit stairs shall be not less than 920 mm measured vertically to the top of the guard from a line drawn through the outside edges of the stair nosing and 1070 mm around landings.

(3) The height of guards on exit ramps and their landings shall be not less than 1070 mm measured vertically to the top of the guard from the ramp surface.

(4) The height of guards of exterior stairs and landings more than 10 m above adjacent ground level shall not be less than 1500 mm measured vertically to the top of the guard from a line drawn through the outside edges of the stair nosings."

3.4.3 Comments

The Alberta Building Code provides extensive detail on specifications for handrails and guardrails, but does not always require handrails on both sides of a ramp or stairway. Handrails located on both sides aid people with the use of only one hand.

3.4.4 Proposed Guidelines

Handrails should be located on both sides of a ramp or stairway.[2]

The outside diameter or width of a handrail should be 35-38 mm, to ensure that those with limited hand functions are able to firmly grasp the rail. In addition, the smaller dimension enables people wearing gloves in winter to easily and firmly grasp the handrail.

NOTE: Designers should consult with the City for alternative designs and diameters.

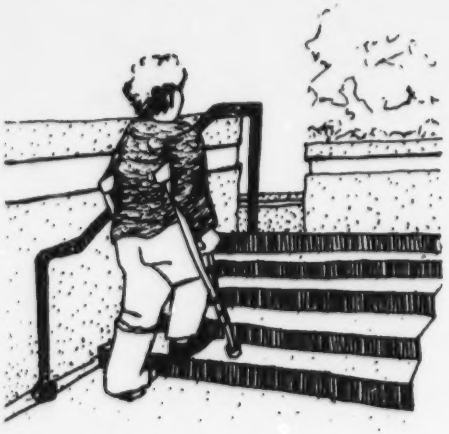
The preferred height of handrails within the required 800 to 920 mm range is 850 mm.[3]

All handrails should be colour/brightness contrasted from their surrounding surface.[4]

A tactile cue, such as a raised number, should be placed on the top surface of a handrail to warn the visually impaired of a main exit. A tactile cue should also be placed on each landing at the end of the handrail to indicate the floor number.[5]

Notes

1. Canadian Standards Association, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
2. Harkness. Sara P. & Groom, James N., Building Without Barriers for the Disabled, 1976.
3. Communication from Consumer Groups.
4. C.N.I.B., Access Needs of Blind and Visually Impaired Travellers in Transportation Terminals, 1987.
5. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.



3.5 STAIRS

3.5.1 Principle/Rationale

Some ambulatory people with balance problems or visual impairments find stairs easier to use than ramps. It is important that the rise and run be designed so the stairs are not overly strenuous or create a hazard.

3.5.2 Existing Regulations

3.5.2.1 Tactile Warning Strip

Alberta Building Code 1990 3.3.1.7.(2)

"In a barrier-free path of travel, a downward change in elevation shall be signalled by the use of a 600 mm wide tactile warning strip placed 250 mm from the edge and for the full width of a stair, escalator, moving walkway, ramp or platform and identified using colour and brightness contrast."

3.5.2.2 Slip Resistance of Stairs

Alberta Building Code 1990 3.4.6.1.(1)

"Treads and landings of interior and exterior stairs and ramps accessible to the public shall have a slip-resistant finish or be provided with slip-resistant strips which extend not more than 1 mm above the surface of the tread, landing or ramp."

3.5.2.3 Minium Number of Risers

Alberta Building Code 1990 3.4.6.2

"Every flight of interior stairs shall have not less than 3 risers."

3.5.2.4 Landings

Alberta Building Code 1990 3.4.6.3.(2), (3), and (4)

"(2) The length and width of landings shall be at least the width of stairways in which they occur, except that in a straight run the length of a landing need not be more than 1100 mm.

(3) Where a doorway or stairway empties onto a ramp through a side wall, there shall be a level area extending across the full width of the ramp, and for a distance of 300 mm on either side of the wall opening, excepting one side when it abuts on an end wall.

(4) Where a door or stairway empties through an end wall onto a ramp, there shall be a level area across the full width of the ramp and along its length for not less than 900 mm."

3.5.2.5 Stair Treads & Risers

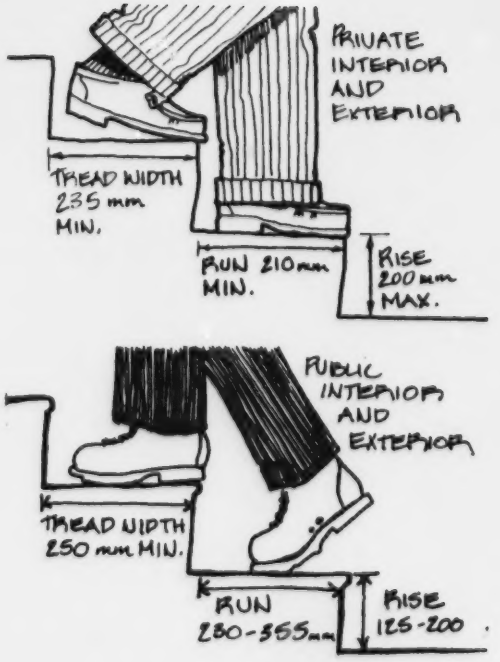
Alberta Building Code 1990 3.4.6.7.(1)-(5)

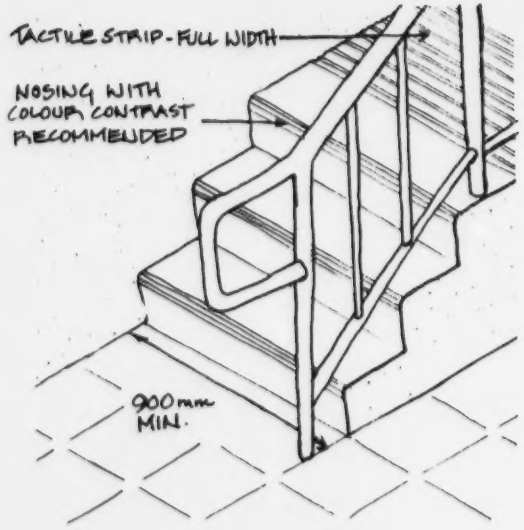
"(1) Except as otherwise permitted for fire escapes in Sentence 3.4.7.5.(1), treads in every exit stair shall have a run of not less than 230 mm and not more than 355 mm exclusive of nosings.

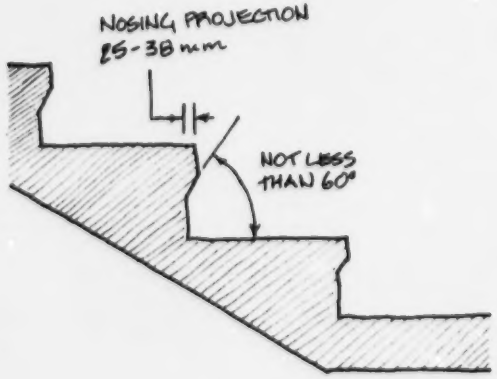
(2) Stairs referred to in Sentence (1) shall have a rise between successive treads of not less than 125 mm and not more than 200 mm.

(3) Treads and risers in every exit stair, except a fire escape stair, shall have uniform run and rise in any one flight, and shall not alter significantly in run and rise in successive flights in any stair system.

(4) Where the run of any tread in an exit stair is less than 250 mm, a nosing of not less than 25 mm shall be provided beyond the face of the riser, or an equivalent back slope on the riser shall be provided.







(5) The front edge of stair treads in exits and public access to exits shall be at right angles to the direction of exit travel."

3.5.3 Comments

The Alberta Building Code provides adequate dimensions for the rise and run of steps. Although the basic functional requirements for stairs remain constant, outdoor climatic variations should be recognized and incorporated. A rise of 150 mm and a run of 300 mm is recommended for public exterior stairs for ease of ascent and allowance for winter boots and snow buildup.

CAN/CSA-B651-M90, Barrier-Free Design, exceeds the Alberta Building Code requirements in terms of safety for stairs and is included in Section 3.5.4.

3.5.4 Proposed Guidelines

3.5.4.1 Specifications for Both Interior and Exterior Stairs

Stairs should be located out of direct walkways or corridors.[1]

Isolated steps or a large expanse of steps should be avoided, since they are often difficult for people with visual impairments to detect.[2]

A flight of stairs should have uniform dimensions and no open risers.[3]

Nosings should not project more than 38 mm, nor have abrupt undersides.[4]

The horizontal face of nosings should be colour-contrasted with the tread. This ensures the tread edge is more clearly visible in descent.[5]

Detectable warning surfaces should be provided at the top of the stairs.[6]

Illumination should be positioned to minimize glare and shadow.[7]

Heavily patterned carpets or tiles should not be used on stairs because they create figure-ground confusion and obscure the definition of the tread nosing.[8]

3.5.4.1 Outdoor Conditions

Where possible, stairs should be protected from climatic variations or maintained free of snow and ice.

Stairs should not be shaded by vegetation or other elements which prevent snow and ice from melting.[9]

Notes

1. C.N.I.B., Access Needs of Blind & Visually Impaired Travellers in Transportation Terminals, 1987.
2. Thorpe, Stephen, Designing for People With Sensory Impairments, 1986.
3. Canadian Standards Association, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
4. Same as Note 3.
5. Same as Note 3.
6. Same as Note 3.
7. Communication from consumer group.
8. Same as Note 1.
9. Same as Note 1.

3.6 BUILDING ENTRANCES

3.6.1 Principle/Rationale

Entrances, particularly the main accessible one, should be readily distinguishable in the facade and should provide an easy transition into the building. The effect of seasonal weather conditions, such as strong winds and drifting snow, should be considered in the design of building entrances.

3.6.2 Existing Regulations

Alberta Building Code 1990 3.7.1.2.(1) - (3)

"(1) Except as required in Sentence (2), every building referred to in Article 3.7.1.1. shall have at least one entrance intended for general use by the public or the occupants designed in conformance with Article 3.7.3.3. and opening to the outdoors at sidewalk level or to a ramp conforming to Article 3.7.3.4. leading to a sidewalk (see Appendix A).

(2) Where a suite of Group A, D or E occupancy is located in the first storey of a building or in a storey to which a barrier-free path of travel is provided and is completely separated from the remainder of the building so that there is no access to the remainder of the building, such suite shall have at least one barrier-free entrance in conformance with Sentence (1).

(3) Where entrances are equipped with security systems, both visual and audible signals shall be used to indicate when the door lock is released."

Alberta Building Code 1990 A-3.7.1.2

"An accessible route should exist from the sidewalk or roadway and parking area to an accessible building entrance. This route should be located so that disabled persons do not have to pass behind parked cars."

Alberta Building code 1990 3.7.3.3.(11)

"Vestibules located in a barrier-free path of travel shall be arranged to allow the movement of wheelchairs between doors and shall provide a distance between 2 doors in series of not less than 1200 mm plus the width of any door that swings into the space in the path of travel from one door to another."

3.6.3 Comments

Although the Alberta Building Code has no requirements for entrances being distinguishable or providing an easy transition, design consideration should be given to these two important factors as they benefit everyone. A distinguishable entrance provides direction and orientation.

When the door lock is released, visual and audible signals should be used to alert both the visitors and the occupants.

3.6.4 Proposed Guidelines

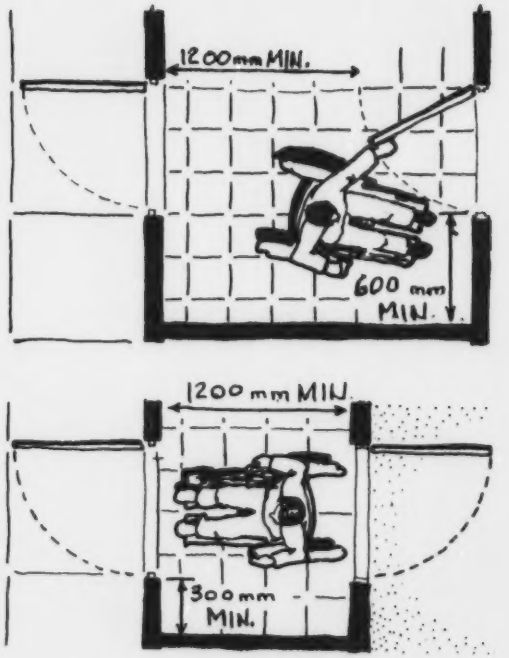
Identification of an entrance should be enhanced by good lighting.[1]

Providing adequate transition from exterior to interior light assists people with visual impairments, who can be slower to adjust to the difference in levels of light. This transition space should be well lit.[2]

Entrances should be designed so that wind and snow do not prevent the normal use of doors.[3]

When entrances must be located towards the prevailing winds, measures to minimize the effects should be used, such as walls and/or vegetation.[4] Drainage should be directed away from the entrance.

Rugs with non-slip underpadding at entrances ease the transition from the outdoor environment to interior spaces by absorbing much of the snow, ice and slush accumulated on winter boots and shoes. This prevents people from slipping on any smooth floor materials used inside.[5]



A vestibule should have enough space between to allow a person in a wheelchair easy manoeuverability when opening the second set of doors. A clear space should be allowed beyond the door handle to allow the person to pull the door open easily.

Notes

1. Thorpe, Stephen, Designing for People with Sensory Impairments, 1986.
2. Winter Cites Association and City of Sault Ste. Marie, Winter Cities Design Manual, 1990.
3. Same as Note 2.
4. Same as Note 2.
5. Same as Note 2.

3.7 DOORS AND DOORWAYS

3.7.1 Principle/Rationale

Doors that are wide and easy to open benefit everyone. The passage is easier for people with disabilities, seniors, people carrying packages, or those wheeling strollers.

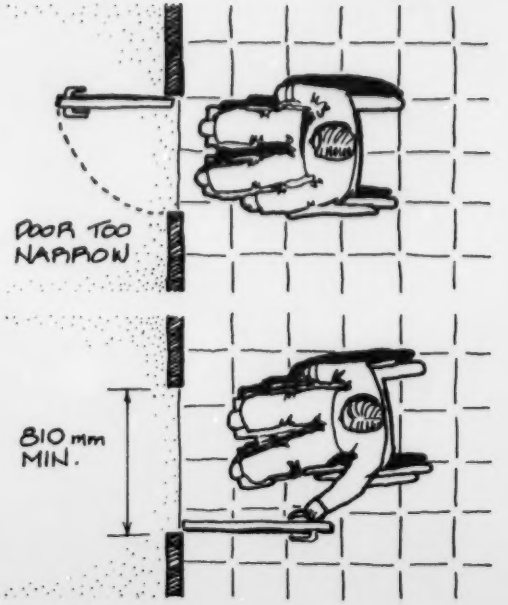
3.7.2 Existing Regulations

3.7.2.1 Interior Doors

Alberta Building Code 1990 3.3.1.12.(1)

"Every door that opens into or is located within a public corridor or other facility that provides access to exit from a suite shall

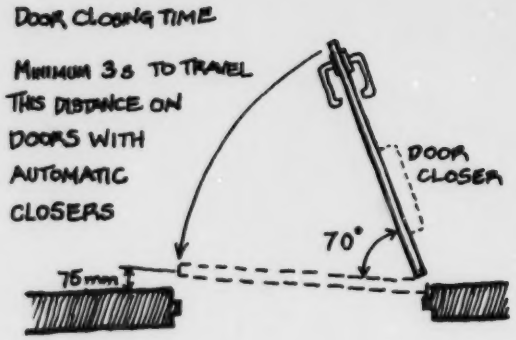
a) be not less than 810 mm in width where there is only one door leaf,
b) have no single leaf in any multiple leaf door less than 610 mm wide,
c) not open onto a step, and
d) be readily openable in travelling to an exit without requiring keys, special devices or specialized knowledge of the door opening mechanisms, except that this requirement does not apply to doors serving a contained use area, or a impeded egress zone, provided the locking devices conform to Sentence (2)."

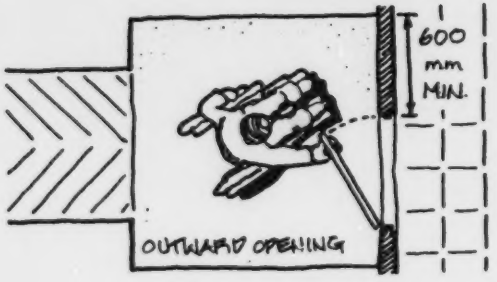


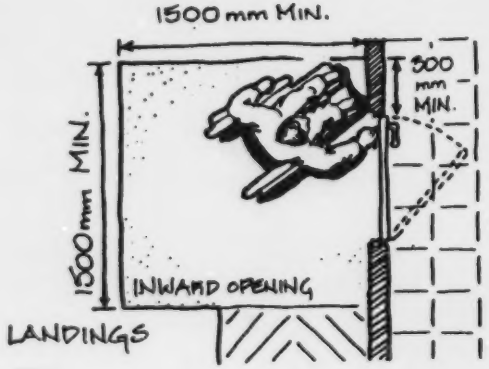
Alberta Building Code 1990 3.7.3.3.(1), (2), (7), (8) and (9)

"(1) Every doorway that is located in a barrier-free path of travel shall have a clear width of not less than 800 mm when the door is in the open position and the door shall be openable with one hand.

(2) The doorway to at least one bathroom within a suite of residential occupancy shall have a clear width of not less than 760 mm when the door is in the open position. (See Appendix A.)







(7) Except as permitted in Sentence (8) and except for doors with power door operators, closers for doors in a barrier-free path of travel shall be designed to permit doors to open when a force of not more than 38 N is applied to the handles, push plates or latch-releasing devices in the case of exterior doors and 22 N in the case of interior doors.

(8) Sentence (7) does not apply to doors at the entrances to dwelling units, or where greater forces are required in order to close and latch the doors against prevailing differences in air pressures on opposite sides of the doors. (See Appendix A.)

(9) Except for doors at the entrance to dwelling units, closers for interior doors in a barrier-free path of travel shall have a closing period of not less than 3 s measured from when the door is in an open position of 70° to the doorway, to when the door reaches a point 75 mm from the closed position, measured from the leading edge of the latch side of the door. (See Appendix A.)"

3.7.2.2 Door Openers

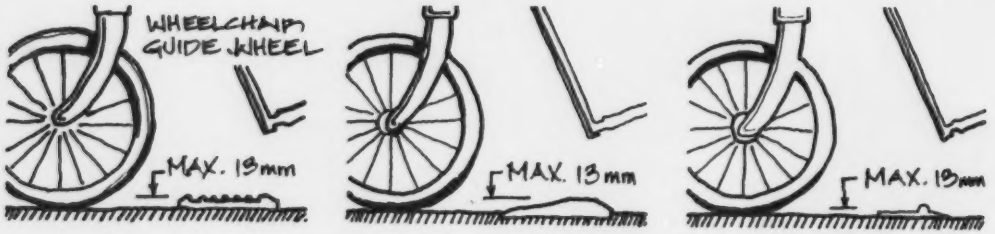
Alberta Building Code 1990 3.7.3.3.(3)

"Door operating devices shall be of a design which does not require tight grasping and twisting of the wrist as the only means of operation."

3.7.2.3 Thresholds

Alberta Building Code 1990 3.7.3.3.(4)

"Thresholds for doorways referred to in Sentences (1) and (2) shall not be more than 13 mm higher than the finished floor surface and shall be bevelled to facilitate the passage of wheelchairs."



3.7.2.4 Exit Doors

Alberta Building Code 1990 9.9.6.4.(1)

"Every exit door or door that opens into or is located within a public corridor or other facility that provides access to exit from a suite shall

a) be not less than 2030 mm high,
b) be not less than 810 mm wide where there is only one door leaf, and
c) have no single leaf less than 610 mm wide in any multiple leaf door."

3.7.2.5 Clear Space

Alberta Building Code 1990 3.7.3.3.(10)

"Every door equipped with a closer in a barrier-free path of travel shall have a clear space beyond the latch side of not less than

a) 600 mm where the door swings towards the approach side, and
b) 300 mm where the door swings away from the approach side. (See Appendix A.)"

3.7.2.6 Power Door Operators

Alberta Building Code 1990 3.7.3.3.(5)

"Except as permitted in Sentence (6), the door for the entrance described in Article 3.7.1.2. shall be equipped with a power door operator in

a) hotels,
b) buildings of Group B, Division 2 major occupancy, and
c) buildings of Group A, D or E major occupancy more than 500 m² in building area. (See Appendix A.)"

Alberta Building Code 1990 A-3.7.3.3.(5)

"Doors equipped with a power operator activated by a pressure plate identified with the international symbol for accessibility or, where security is required, by a key, card or radio transmitter, and that can otherwise be opened manually meet the intent of the requirement. The location of these activating devices should ensure that a wheelchair will not interfere with the operation of the door once it is activated.

Swinging doors equipped with power operators which are activated automatically and open into passing pedestrian traffic should be provided with a guard or other device designed to prevent pedestrians from stepping in the swing area of the door. This guard or device should be detectable by blind persons. For example, inverted U-shaped guards should have an additional rail at a height not more than 680 mm so that it is detectable by the long cane. These doors should also have a device (mat or other sensor) on the swing side to prevent the door from opening if someone is standing in the swing area."

3.7.3 Comments

People with limited mobility, strength, or balance problems find opening doors, particularly exterior doors, difficult if not impossible. This is exacerbated by adverse climatic and lighting conditions. Automatic door opening devices should be used.

3.7.4 Proposed Guidelines

3.7.4.1 Specifications for People with Visual Impairments

Door push plates should be of contrasting colours for the visually impaired.[1]

Plate glass doors should be designed so that people with visual impairments can readily identify them.[2]

Numbers on doors should be raised and located at eye level for easy reading by people with visual impairments.[3]

Due to fire regulations, doors must open outward, which can create a hazard for people with visual impairments. To rectify this problem, doors should be recessed in a vestibule so as not to create a hazard for people walking beside a building.

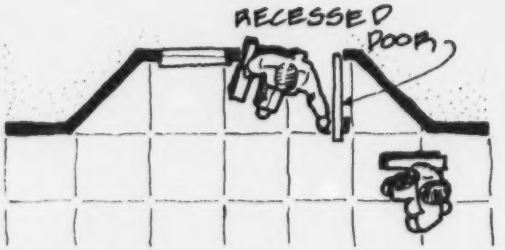
3.7.4.2 Door Openers

Automatic door openers, power assisted mechanisms or magnetic doorhold-open devices should be used on doors on major public pedestrian thoroughfares.

Manual door openers should be mounted at a height of 800 to 850 mm from the floor.[4]

All manual door openers should have a level shape so that they do not require grasping and twisting of the wrist.[5]

Clearance between the handle and the door should be a minimum of 50 mm. This will aid those with limited hand functions, and allow the door to be pulled open using an arm, and those with gloved hands in winter conditions.[6]

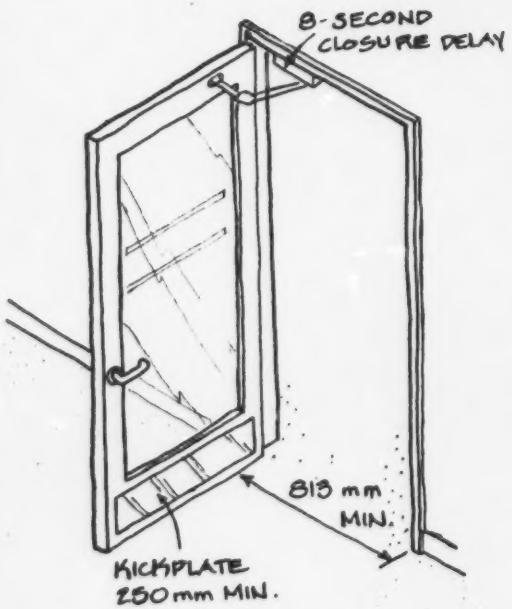


3.7.4.3 Kickplates

The bottom of a manual door should have a smooth uninterrupted kickplate to protect the door from wheelchair footrests.[7] A minimum height of 300 mm is recommended.

LEVER-TYPE DOOR HANDLE

3.7.4.4 Entrances



If there is more than one door required at a major entrance, both a left-handed and a right-handed door should be provided. This allows people with physical disabilities a choice, they may open the door corresponding to their stronger arm.[8]

Doors in a series should open in the same direction. This requires single doors hung in a series to be hinged on the same side.[9]

Doormats should be secured and should not project more than 13 mm above the floor finish.[10]

When turnstiles or revolving doors are provided, an entrance should be placed immediately to one side of the revolving door or turnstile, for easy access by people with disabilities.[11]

Automatic door closers should have a delay feature keeping the door open for a minimum of 8 seconds, with the door held at an angle of between 70° and 90°.

Sliding automatic doors should be installed in new construction.[12]

Notes

1. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.
2. National Research Council Canada, National Building Code of Canada 1990.
3. Same as Note 2.
4. Calgary Action Group of the Disabled.
5. Rehabilitation Society of the Calgary. Accessibility Standards and Guidelines. Public Buildings, 1986.
6. Same as Note 5.
7. Harkness and Groom, Building Without Barriers for the Disabled, 1976.
8. Same as Note 1.
9. Same as Note 1.
10. Mace, R.I., Accessibility Modifications, Special Office of the Handicapped, North Carolina Department of Insurance, 1979.
11. Same as Note 1.
12. Goldsmith, S., Designing for the Disabled, 3rd. ed., RIBA Publications Ltd., London, 1976.

3.8 INTERIOR CORRIDORS

3.8.1 Principle/Rationale

A corridor must accommodate the width of the wheelchair and the user's hands as well. Where there is a 90° turn, greater clearance is required to accommodate the full length of the wheelchair.

Where possible, and especially where many wheelchairs are likely to be used, there should be sufficient space for two wheelchairs to pass.

3.8.2 Existing Regulations

Alberta Building Code 1990 3.3.1.9.(1)-(4)

"(1) The minimum width of every public corridor shall be 1100 mm.

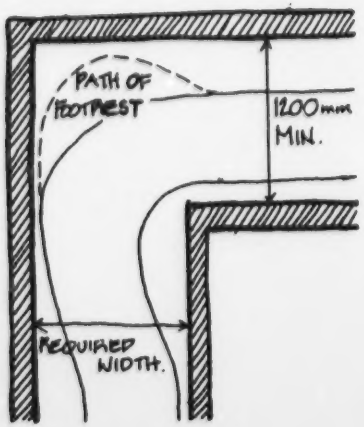
(2) The minimum unobstructed width of every corridor used by the public and every corridor serving classrooms or patients' sleeping rooms shall be 1100 mm.

(3) Except as permitted in Sentence (4), obstructions located within 1980 mm of the floor shall not project more than 100 mm horizontally into exit passageways, public corridors, corridors used by the public or corridors serving classrooms or patients' sleeping rooms in a manner that would create a hazard for visually impaired persons travelling adjacent to walls.

(4) The horizontal projection of an obstruction in Sentence (3) is permitted to exceed 100 mm where it extends to less than 680 mm above the floor. (See Appendix A.)"

OBJECTS SHOULD NOT PROJECT MORE THAN 100mm FROM A WALL OTHERWISE THEY CAN CREATE A HAZARD FOR PEOPLE WITH VISUAL IMPAIRMENTS.

INTERIOR PUBLIC CORRIDOR.



PATH OF WHEELCHAIR.

Alberta Building Code 1990 A-3.3.1.9.(4)

"The sweep of a cane used by blind or visually impaired persons normally detects obstructions that are within 680 mm of the floor. Any obstructions above this height would not normally be detected and can, therefore, create a hazard if it projects more than 100 mm into the path of travel."

3.8.3 Comments

The minimum clearance of an interior corridor required by the Alberta Building Code is greater than that of other publications. Several publications recommend a minimum clear width of 915 mm. The Alberta Building Code requires a minimum of 1100 mm, which is preferred.

However, additional manoeuvring space is necessary at corners and doorways. The length of a wheelchair, including footrests, and turning radius should be considered.

The Building Code requirement that objects which protrude more than 100 mm from the wall shall extend to within 680 mm of the floor is not effective. The limit should be set lower to 255 mm to ensure that canes will detect such objects.

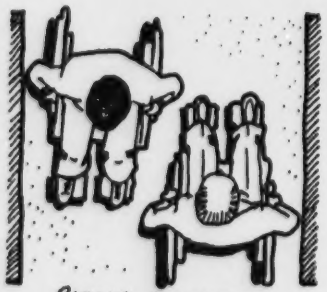
3.8.4 Proposed Guidelines

The ideal width of an interior corridor is 1525 mm, which allows two wheelchairs to pass each other without difficulty.[1]

Due to office space restrictions, a corridor width of 1525 mm is difficult to achieve in some areas. A recommended minimum width for private corridors, including store and restaurant aisles, should be 920 mm.

At corners and doorways, the minimum depth of floor area should be 1200 mm. For greater ease of manoeuvrability, 1500 mm is recommended.

Objects which protrude more than 100 mm from the wall should continue to within 255 mm from the floor.[2]



Notes

1. Harkness, Sarah P. and Groom, James N., Building Without Barriers for the Disabled, 1976.
2. Communication from consumer groups.

3.9 ELEVATORS

3.9.1 Principle/Rationale

An elevator is vital to a non-ambulatory person because it is often the only access to the different levels of a building. A poorly designed elevator can be as much of a barrier as stairs.

3.9.2 Existing Regulations

Alberta Building Code 1990 3.7.3.5.(1) and (3)

"(1) Passenger elevators which are required to be barrier-free shall conform to Appendix E of CAN/CSA-B44-M, "Safety Code for Elevators, Escalators, Dumbwaiters, Moving Walks and Freight Platform Lifts.

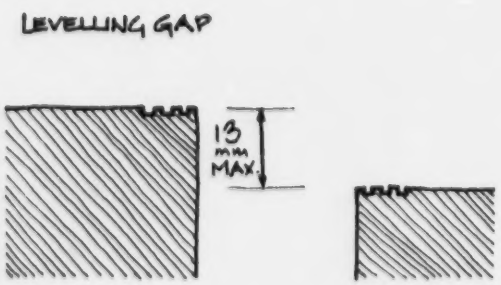
(3) The passenger-type elevator referred to in Sentence (1) shall have

a) hall or in-car audible signals that indicate at not less than 50 dBA the direction the elevator is moving when it stops at a landing by sounding once for the up direction or twice for the down direction or a similar verbal annunciator acceptable to the authority having jurisdiction;
b) in-car audible signals that indicate at not less than 50 dBA the arrival at, or passing of, each floor; and
c) an alarm bell button that visually indicates the operation of the alarm bell."

Appendix E CAN/CSA-B44-M90, Standard Elevator Requirements for the Disabled:

E.2.1 Operation and Levelling

"The elevator shall be automatic and be provided with a two-way automatic-maintaining levelling device to maintain the floor level to ±13 mm."



E.4.1 Door Size

"The minimum clear width for elevator doors shall be 910 mm."

E.5.1 Door Protective and Reopening Device

"Doors shall be provided with a door-reopening device that will function to stop and reopen a car door and an adjacent hoistway door to at least 910 mm, in case the car door is obstructed while closing. This reopening device shall also be capable of sensing an object or person in the path of a closing door at a nominal 125 mm ±25 and 735 mm ±25 above the floor without requiring contact for activation."

E.5.2

"Door-reopening devices shall remain effective for a period of not less than 20 seconds."

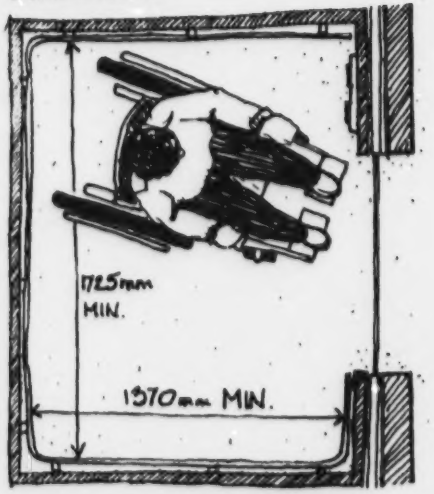
E.6.1 Door Delay (Passenger Service Time)

"From the time the doors start to open, a minimum period of 4 s shall elapse before the doors start to close, if it is a hall call and 3 s if it is a car call. This time may be reduced after operation of the door close button."

E.7.1 Car Inside

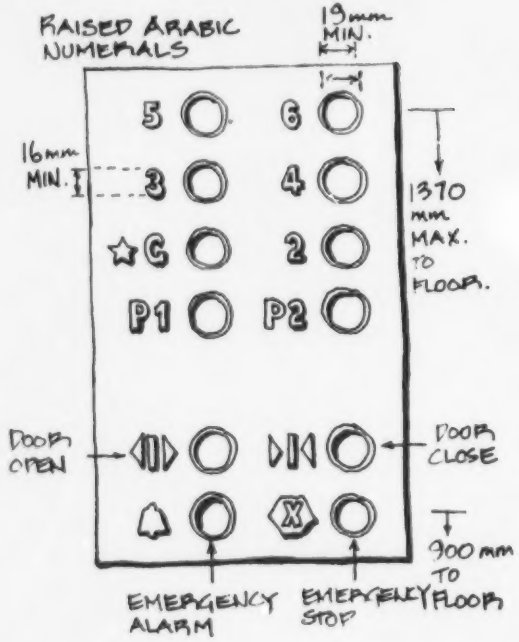
"The minimum clear distance between walls or between wall and door, excluding return panels, shall be not less than 1725 x 1370 mm. The minimum distance from wall to return panel shall be not less than 1300 mm. On cars designed to allow for the turning of a wheelchair, the minimum clear distance between walls or between wall and door, excluding return panels, shall be not less than 1725 x 1370 mm."

ELEVATOR CAR INSIDE DIMENSIONS



THERE SHOULD BE ENOUGH SPACE IN AN ELEVATOR CAR TO ALLOW A PERSON IN A WHEELCHAIR TO TURN AROUND

The operating buttons and emergency controls shall be at a height that is convenient to reach for someone in a wheelchair.



Indicators shall be provided in a car to show what floor the car is on.

E.8.1 Car Controls

"Controls shall be readily accessible from a wheelchair upon entering an elevator."

E.8.2

"Emergency controls and door-operating buttons shall be grouped together at the bottom of the control panel. The centre line of the alarm button and the emergency stop switch shall be a nominal not less than 890 mm from the floor. The centre line of the highest floor button shall be no higher than 1370 mm from the floor. Other controls may be located where it is convenient."

E.8.3

"Floor registration buttons shall be a minimum 19 mm in size and they may be raised, flush, or recessed. The depth of flush or recessed buttons when they are being operated shall not exceed 10 mm."

E.8.4

"Arabic numerals shall be adjacent on the left of the floor button on a contrasting colour background. Markings shall be a minimum of 16 mm high and raised a minimum of 0.75 mm. Permanently attached plates are acceptable. Where the call buttons are mechanical, the raised markings may be on the buttons."

E.9.1 Car Position Indicators

"An indicator shall be provided in the car to show the position of the car in the hoistway, by illuminating the indication corresponding to the landing at which the car is stopped or passing. Indication characters shall be on a contrasting colour background and a minimum of 16 mm in height."

E.10.1 Telephones

"The telephone shall be located a maximum of 1220 mm from the floor with a minimum cord length of 900 mm."

E.11.1 Floor Covering

"The floor shall have a firm and skid-resistant surface that permits easy movement of wheelchairs."

E.12.1 Handrails

"Handrails shall be provided on all non-access walls 800 to 920 mm with a space of 35 - 45 mm between the rails and wall."

E.13.1 Illumination

"The illumination at the car controls and landing sill shall be not less than 100 lx."

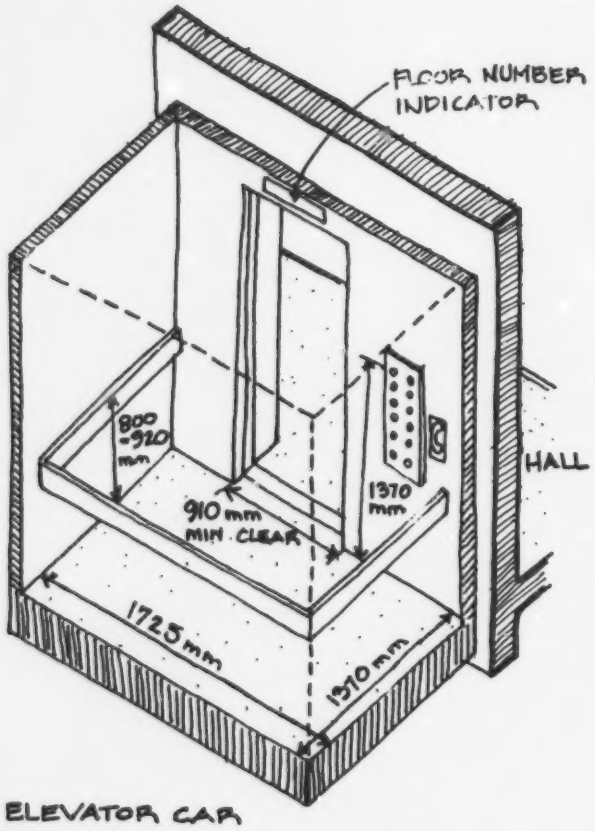
E.14.1 Hall Buttons

"The centre line of the hall call button shall be 1070 ±25 mm above the floor. Buttons shall be a minimum of 20 mm in size, and shall be mounted one above the other."

E.15.1 Hall or In-Car Lanterns

"Hall or in-car lanterns shall be provided. The centre line of the fixture shall be a minimum of 1830 mm above the floor. An audible signal, shall be provided when the elevator stops at the landing. Visual elements shall be a minimum of 60 mm in the smallest direction."

AN AUDIBLE SIGNAL SHOULD INDICATE WHEN THE CAR HAS STOPPED AT EACH FLOOR.



E.16.1 Floor Designations

"Arabic numerals a minimum of 50 mm high and raised at least 0.75 mm shall be placed on both sides of the door jambs, with the centre line at 1500±25 mm above the floor to identify the floor level."

3.9.3 Comments

Elevator requirements for access by people with disabilities are not a mandatory part of the CAN/CSA-B44-M90, Safety Code for Elevators, but are only provided as reference where accessibility is being incorporated. It is recommended that the Alberta Building Code require all passenger elevators to be accessible to people with disabilities.

Floor registration buttons (refer to E.8.3) should be raised, since flush or recessed buttons are difficult to activate for people with limited manual dexterity.

3.9.4 Proposed Guidelines

3.9.4.1 Clear Space

The minimum turning space in front of elevator doors should be 1200 mm.[1]

3.9.4.2 Door Closure

Doors on elevators should start to close after 8 seconds in the fully open position.[2]

3.9.4.3 Emergency Communication Devices

Telephones should be located a maximum of 900 mm from the floor with a cord length of 760 mm. Telephones should have a variable volume control.[3]

Alternatively, a link to security through an intercom system, activated by a protruding button, is more accessible.

3.9.4.4 Hall Buttons

Hall buttons should be located between elevators and easily identifiable.[4]

No obstructions shall be placed under hall elevator call buttons.

3.9.4.5 Verbal Annunciators

Verbal annunciators identifying the floor level and the direction of travel should be installed for people with visual impairments, and for those who cannot see the floor indicator at the back of a crowded elevator.[5]

3.9.4.6 Exterior Elevators

Exterior elevators should be oriented away from the prevailing winds to keep the car free of snow, rain and debris. Waiting areas should be sheltered, positively drained, and well lit.

Glass walls should be installed to ensure security by increasing visibility.

Notes

1. Communication from consumer groups.
2. Same as Note 1.
3. CSA Standard, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
4. Same as Note 1.
5. Same as Note 1.

3.10 +15 (PLUS 15) SYSTEM

3.10.1 Principle/Rationale

Having an accessible +15 system allows people with disabilities to travel through the downtown core easily and quickly without having to contend with hazards such as vehicular traffic and sidewalk obstructions at grade level.

Since non-ambulatory persons have limited mobility, adverse weather conditions can hinder their movement. The +15 system provides alternative routes through the downtown which are always warm and dry. The glass construction allows a visual connection with the outdoors, reducing security problems.

3.10.2 Existing Regulations

The +15 design policies which affect disabled access are found in the following documents: Land Use By-law 2P80, +15 Policy, Downtown Handbook of Public Improvements, Building Code Applications to +15, the Standard Development Agreement, and the Report on City of Calgary +15 Access Stairs.

3.10.2.1 Width of Bridges and Walkways

"The minimum unobstructed width for +15 bridges, walkways and lane links shall be 4500 mm. Widths up to 6000 mm should be encouraged only in locations where high pedestrian volume is anticipated (retail areas)."

3.10.2.2 Ramps/Elevators

"One elevator must provide access to both grade and +15 levels."

"All walkways should be negotiable by the disabled with elevator access."

"+15 bridges, walkways, and lane links shall be accessible to persons with push carts or carriages, the elderly, the physically handicapped and others whose mobility is impaired. Where ramps are provided to achieve this objective, maximum ramp grades of 1 in 12 should be required."

PLUS 15 BRIDGE

3.10.2.3 Floor Surfaces

"All +15 walkways should provide a hard surface flooring material to allow for easy maintenance and to contribute to the perception of walkways as completely public." (Refer to Section 1.2)

3.10.2.4 Stairs

"The minimum unobstructed width for +15 stairs shall be 2000 mm."

"Stairs should be clearly visible and directly adjacent and accessible to street or avenue sidewalk and +15 system."

3.10.2.5 Access/Doors

"Access points should be located at both ends of every bridge."

"The provision of magnetically controlled doors (wired to the building's smoke detector and emergency fire alarm systems) or other such devices on +15 bridges that reduce pedestrian barriers while maintaining adequate fire protection should be encouraged."

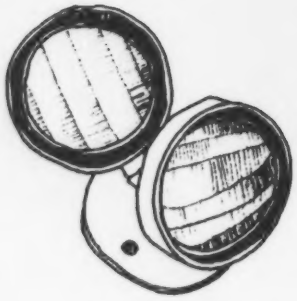
3.10.3 Comments

The design guidelines and policy that have been compiled by the Planning & Building Department have taken into consideration the needs of people with disabilities. They have identified ramping of access areas, width of stairs and width of bridges to make travelling convenient. Although the +15 policy is not very specific about door opening devices, for construction of new +15 bridges, the Planning & Building Department requires that automatic door openers be installed at both ends of bridges.

3.10.4 Proposed Guidelines

The rise and run relationship of stairs should be more gentle for an easier ascent or descent. Exterior stairs should be protected, or properly drained. Refer to Section 3.5, "Stairs".

3.11 EMERGENCY EGRESS



FIRE ALARM SYSTEMS SHOULD INCLUDE FLASHING LIGHTS.

3.11.1 Principle/Rationale

The incorporation of barrier-free design principles in the regulations governing safety and egress benefits everyone, particularly in an emergency. It is essential that everyone, including people who are blind or deaf, receive the same emergency warnings and that people who have physical impairments are able to evacuate a building safely and quickly.

3.11.2 Existing Regulations

3.11.2.1 Audibility of Alarm Systems

Alberta Building Code 1990 3.2.4.19.(1)

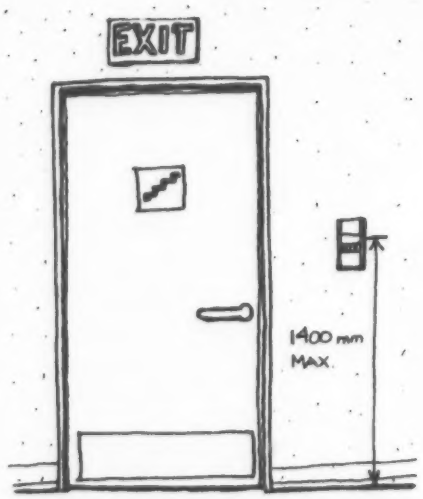
"Audible signal appliances forming part of a required fire alarm system shall be installed in a building so that alert signals, alarm signals and voice messages can be heard intelligibly throughout the floor area in which they are installed."

3.11.2.2 Visual Signals

Alberta Building Code 1990 3.2.4.20.(2) and (3)

"(2) Visual signal appliances required in a building or portion thereof intended for use primarily by persons with hearing impairments shall be installed so that the signal from not less than one appliance is visible throughout the floor area or portion thereof in which they are installed.

(3) In buildings required to be barrier-free, a visual signal appliance shall be installed in close proximity to each required audible signal appliance."



MANUAL PULL STATIONS ARE LOCATED NEAR EXIT STAIRS

3.11.2.3 Manual Pull Stations

Alberta Building Code 1990 3.2.4.17

"A manual pull station shall be installed in every floor area near every required exit."

3.11.2.4 Voice Communication Systems (Required for Buildings Higher than 36 m)

Alberta Building Code 1990 3.2.4.22.(1) and (5)

"(1) A voice communication system required in Subsection 3.2.6 shall consist of

a) a 2-way communication system in each floor area, with connections to the central alarm and control facility and to the mechanical control centre, and

b) loudspeakers operated from the central alarm and control facility which are designed and located so as to be audible in all parts of the building, except that this requirement does not apply to elevator cars.

(5) The 2-way communication system referred to in Clause (1)(a) shall be installed so that emergency telephones are located in each floor area near exit stair shafts."

3.11.2.5 Protection on Floor Area with a Barrier-Free Path of Travel

Alberta Building Code 1990 3.3.1.7(1)

"Where a barrier-free path of travel is provided above or below the first storey in a building that is not sprinklered, every floor area having a barrier-free path of travel shall:

a) be served by an elevator conforming to Sentences 3.2.6.9.(4) to (6), protected against fire in conformance with Clauses 3.2.6.9.(3)(b) or (c);

b) be divided into not less than 2 zones by fire separations conforming to Sentences 3.3.3.6.(8) and (9) so that,

i) persons with physical disabilities can be accommodated in each zone, and

ii) the travel distance from any point in one zone to a doorway leading to another zone shall be not more than the value for travel distance permitted by Sentence 3.4.2.5.(1) for the occupancy classification of the zone; or

c) in the case of residential occupancies, be provided with balconies that,

i) are not less than 1.5 m deep from the outside face of the exterior wall to the inside edge of the balcony, and

ii) provide not less than 0.5 m² of balcony space for each occupant of the suite, except on the storey containing the access entrance described in Article 3.7.1.2.; or

d) have an exterior exit at ground level or a ramp leading to ground level.

(See Appendix A.)"

3.11.2.6 Temporary Refuge for Persons with Disabilities

Alberta Building Code 1990 A-3.3.1.7

"These measures are intended to provide temporary refuge for persons with disabilities. It is acknowledged, however, that the measures cannot provide absolute safety for all occupants in the fire area. It may, therefore, be necessary to develop special arrangements in the fire safety plan to evacuate persons with disabilities from these areas. Details for such a plan are contained in the Alberta Fire Code.

The protected elevator in Clause 3.3.1.7.(1)(a) is intended to be used by fire fighters as a means for evacuating persons with disabilities. It is not intended that this elevator be used by persons with disabilities as a means of egress without the assistance of fire fighters.

Where an estimate is to be made of the number of persons with disabilities in a floor area which can be accommodated in each zone in Clause 3.3.1.7.(1)(b), this estimate may be based on Table 3.7.2.A., which is used to determine the minimum number of spaces to be provided for wheelchair occupants in fixed seating areas. Where more precise information is available, it should be used for sizing the zones."

3.11.2.7 Location of Exits

Alberta Building Code 1990 3.4.2.5.(4)

"Exits shall be located and arranged so that they are clearly visible or their locations are clearly indicated and they are accessible at all times."

3.11.2.8 Horizontal Exits

Alberta Building Code 1990 3.4.6.9.(1), (3), and (4)

"(1) The floor area on each side of a horizontal exit shall be sufficient to accommodate the occupants of both floor areas, allowing not less than 0.5 m^2 of clear floor space per person, except that 1.5 m^2 shall be provided for each person in a wheelchair and 2.5 m^2 for each bedridden patient.

(3) In any horizontal exit where there is a difference in level between the connected floor areas, gradients not exceeding those specified for ramps in Article 3.4.6.6 are permitted to be used.

(4) No stairs or steps shall be used in a horizontal exit."

3.11.2.9 Doors

Alberta Building Code 1990 3.4.6.10.(2) and (3)

"(2) No exit door shall open directly onto a step except that, where there is danger of blockage from ice or snow, an exit door is permitted to open onto not more than one step which shall be not more than 150 mm high.

(3) Exit doors shall be clearly identifiable."

3.11.2.10 Door Release Hardware

Alberta Building Code 1990 3.4.6.15.(2)

"Except as required by Sentence 3.7.3.3.(7), every exit door shall be designed and installed so that, when the latch is released, the door will open under a force of not more than 90 N applied at the knob or other latch releasing device.

3.11.3 Comments

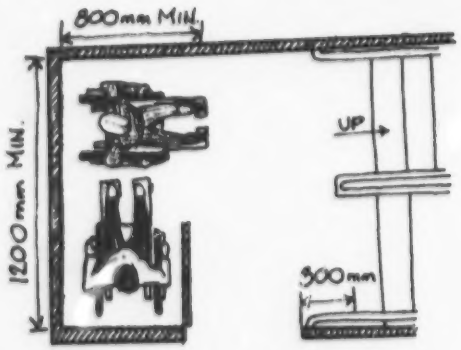
Emergency evacuation requirements rely on the minimum standards of egress and suitable operational procedures, such as the "buddy system". People with disabilities must arrange in advance with co-workers or neighbours for assistance. It is important that the exits and pull stations are easily located and that the emergency procedures are clear.

3.11.4 Proposed Guidelines

3.11.4.1 Visual Alarms

Visual alarms shall be lights that flash at a frequency of approximately 1 Hz in conjunction with the audible emergency alarms. They should be significantly brighter than the ambient light.[1]

The Epilepsy Society has indicated that a flash rate less than 5 Hz poses no danger to undiagnosed epileptics.[2]



EXAMPLE OF AN AREA OF REFUGE IN A STAIRWELL.

3.11.4.2 Tactile Strip on Exit Door

There should be tactile strip, such as a decal, beside or preferably below, the handle of an exit door to clearly identify it as the exit door to people who are blind. This is also beneficial if the area is full of smoke and the exit sign is not visible to all people.

3.11.4.3 Areas of Refuge

Areas of refuge provide not less than 0.5 m^2 of floor space per ambulatory occupant and 1.5 m^2 of floor space per non-ambulatory occupant.[4]

Areas of refuge should be separated from the floor area by a fire separation having a fire-resistance rating at least equal to that required for an exit.[5]

Areas of refuge should be served by an exit or a firefighters' elevator.[6]

Non-ambulatory occupants in areas of refuge should not obstruct egress. The door should not encroach on the space for wheelchairs.[7]

3.11.4.4 Emergency Evacuation Chair

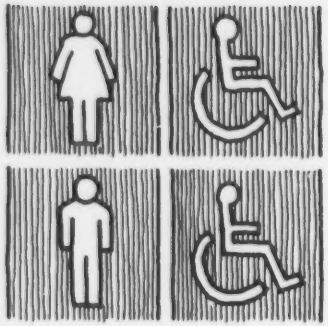
An emergency evacuation chair should be readily available and provide fast egress.

An emergency evacuation chair should be capable of being operated by a person who is smaller than the passenger.

Notes

1. CSA Standard, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
2. FitzPatrick, M., Barkow, B., and Beattie, J. Intercity Travel and the Deaf and Hard of Hearing Traveller, 1990.
3. Communication from Consumer Groups.
4. National Research Council of Canada, National Building Code 1990.
5. Same as Note 1.
6. Same as Note 1.
7. Same as Note 1.

4.0 PUBLIC FACILITIES



4.1 WASHROOMS

4.1.1 Principle/Rationale

It is important that there are washrooms that can serve the needs of people with disabilities. Every floor that is served by an elevator should have an accessible washroom that is easily located and clearly marked as accessible.

4.1.2 Existing Regulations

4.1.2.1 Barrier-Free Washrooms

Alberta Building Code 1990 3.7.2.3.(1) and (2)

"(1) Washrooms shall be barrier-free in conformance with the appropriate requirements in Article 3.7.3.8 to 3.7.3.11.

Alberta Building Code 1990 3.7.2.3.(2)

(2) Washrooms need not conform to the requirements in Sentence (1) provided

a) they are located within suites of residential occupancy;
b) other barrier-free washrooms are provided on the same floor area within 45 m, or
c) they are located in an individual suite having an area of less than 500 m² in buildings where such suite is completely separated from the remainder of the building so that there is no access to the remainder of the building."

4.1.2.2 Water Closet Stalls

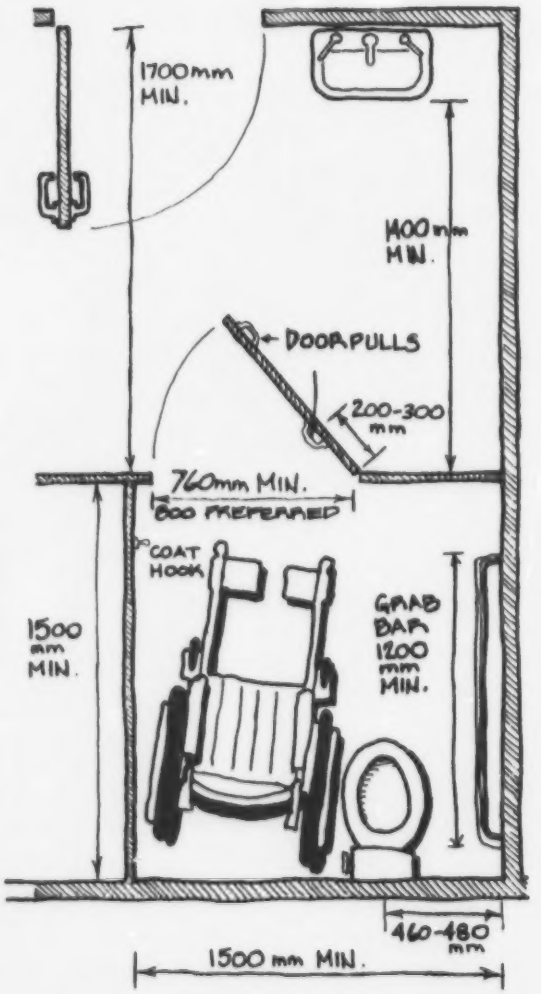
Alberta Building Code 1990 3.7.3.8.(1)

"Where a washroom is required by Article 3.7.2.3 to be barrier-free, at least one water closet stall or enclosure shall:

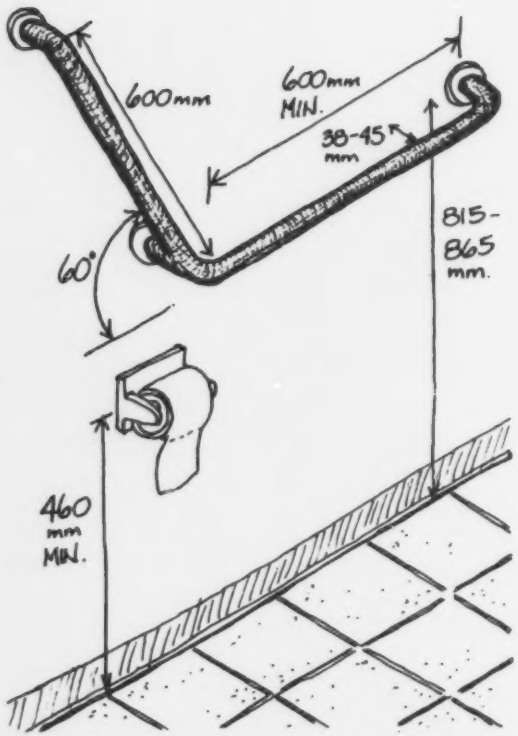
a) be not less than 1500 mm in width by 1500 mm in depth,
b) be equipped with a door which shall

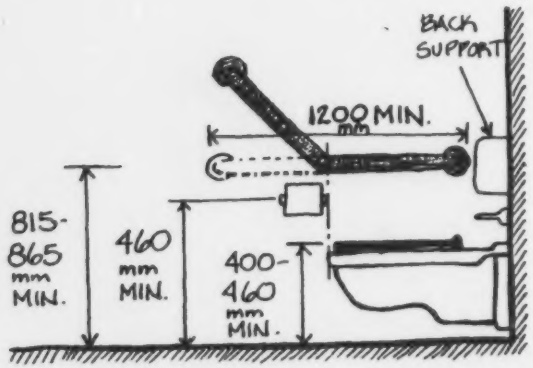
i) be capable of being locked from the inside,
ii) provide a clear opening of not less than 760 mm with the door in the open position,
iii) swing outward, unless sufficient room is provided within the stall or enclosure to permit the door to be closed without interfering with the wheelchair,
iv) be provided on the inside with a door pull not less than 140 mm in length located so that its midpoint is between 200 mm and 300 mm from the hinged side of the door, and between 900 mm and 1000 mm from the floor, (see Appendix A) and
v) be provided with a pull on the outside, near the latch side of the door,

c) have a water closet located so that its centreline is not less than 460 mm and not more than 480 mm from an adjacent side wall on one side,
d) be equipped with a grab bars as described in Sentence (2),
e) be equipped with a coat hook mounted not more than 1400 mm above the floor on a side wall and projecting not more than 25 mm from the wall,
f) have a clearance of not less than 1700 mm between the outside of the stall face and the face of an in-swinging washroom door and 1400 mm between the outside of the stall face and any wall-mounted fixture, and
g) have ancillary items such as a toilet paper dispenser located on the wall nearest to the water closet below the grab bar, not less than 460 mm above the floor, and within easy reach of a person seated on the water closet."



ACCESSIBLE WASHROOM AND WATERCLOSET STALL





4.1.2.3 Grab Bars

Alberta Building Code 1990 3.7.3.8.(2) and (3)

"(2) A grab bar required in Sentence (1) shall

a) be mounted horizontally on the wall behind the water closet so that it extends the full width of the water closet bowl if the water closet does not have a tank, and

b) be mounted horizontally on the wall beside the water closet, and be not less than 1200 mm in length, located with its centreline between 815 mm and 865 mm above the floor and with its midpoint located in line with the front edge of the water closet, or

c) be mounted on the wall beside the water closet and have a horizontal portion 600 mm in length with a 600 mm extension extending upwards to the front and away from the horizontal portion at an angle of 60° to the horizontal with the centreline of the horizontal portion between 815 mm and 865 mm above the floor and the intersection of the horizontal and sloping portions located in line with the front edge of the water closet.

(3) A grab bar described in Sentence (2) shall

a) be installed to resist a load of not less than 1.3 kN applied vertically or horizontally,

b) be not less than 30 mm and not more than 40 mm in diameter, and

c) have a clearance of 35 to 45 mm from the wall."

4.1.2.4 Water Closets and Urinals

Alberta Building Code 1990 3.7.3.9.(1)

"Water closets for disabled persons shall

a) be equipped with seats located at not less than 400 mm and not more than 460 mm above the floor,

b) be equipped with hand-operated flushing controls that are easily accessible to wheelchair users,

c) be equipped with a back support such as a seat lid, and
d) not have a spring-activated seat. (See Appendix A.)"

Alberta Building Code 1990 A-3.7.3.9.(1)

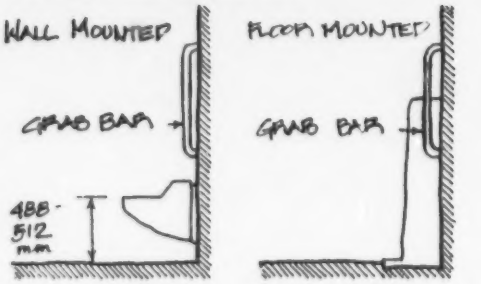
"Wall mounted water closets or floor models with receding bases are preferable because they provide the least amount of obstruction to wheelchairs."

Alberta Building Code 1990 3.7.3.9.(2)

"If urinals are provided in a washroom required by Sentence 3.7.2.3.(1) to accommodate disabled persons, at least one urinal shall be either

a) wall mounted with the opening of the basin between 488 mm and 512 mm above the finished floor, or
b) floor mounted at the same level as the finished floor, with no step being permitted in front of either type of urinal and a vertically mounted grab bar shall be installed on the wall beside the urinal."

In a disabled access washroom, one urinal must be wall-mounted or floor-mounted with a vertically mounted grab bar.



4.1.2.5 Lavatories

Alberta Building Code 1990 3.7.3.10.(1)

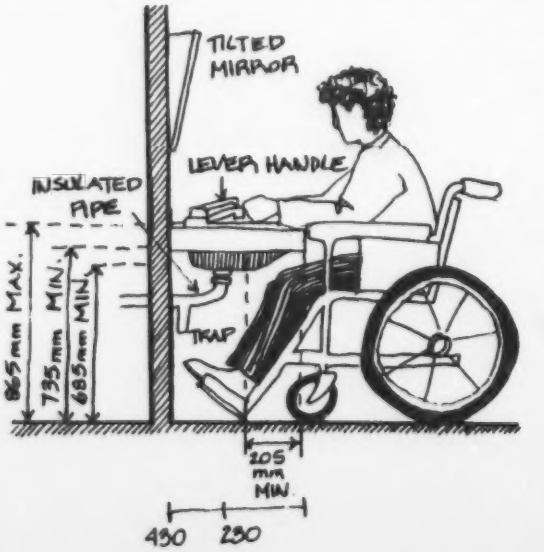
"Barrier-free washrooms shall be provided with a lavatory which shall

a) be located so that the distance between the centreline of the fixture and the side wall is not less than 460 mm,
b) have a top surface height of not more than 865 mm,
c) have a clearance beneath of not less than

i) 735 mm at the front edge of the lavatory,
ii) 685 mm at a point 205 mm back from the front edge, and
iii) 230 mm over the distance from a point 280 mm to a point 430 mm back from the front edge, (see Appendix A)

d) have insulated waste pipes and hot water supply pipes where these pipes present a burn hazard,

LAVATORIES SHOULD HAVE FAUCETS THAT CAN BE UTILIZED BY PEOPLE WITH DISABILITIES.



e) be equipped with faucet handles of the lever type without spring loading, and

f) have washroom accessories, such as soap and towel dispensers, located not more than 1200 mm above the floor in an area that is accessible to persons in wheelchairs."

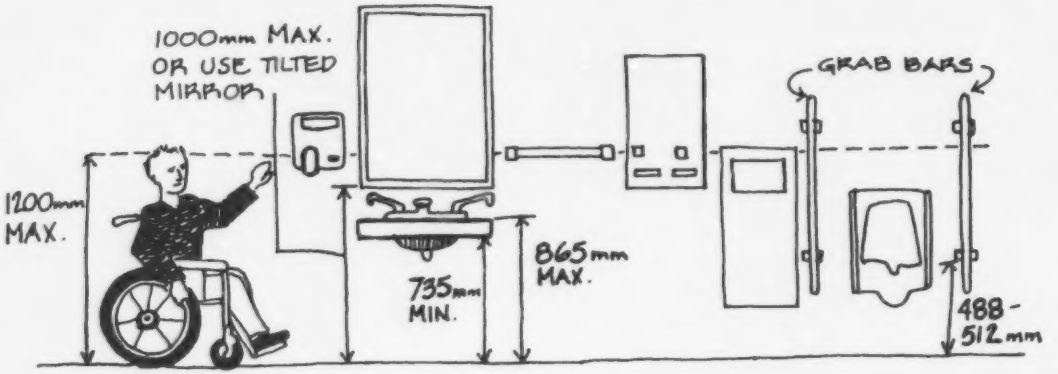
4.1.2.6 Washroom Accessories

Alberta Building Code 1990 3.7.3.10.(2), (3) and (4)

"(2) Shelves or other projections above or adjacent to lavatories shall be located so they will not present a hazard to visually impaired persons.

(3) If mirrors are provided in a washroom required to accommodate physically disabled persons, at least one mirror shall be mounted with its bottom edge not more than 1000 mm above the finished floor, or shall be tilted to be usable by a person in a wheelchair.

(4) In a washroom required to accommodate physically disabled persons, washroom accessories shall be available that are of a type, and are installed, so as to be usable by a person in a wheelchair and shall be not more than 1200 mm from the finished floor to the operating part."



4.1.2.7 Individual Washrooms (containing one toilet and one lavatory)

Alberta Building Code 1990 3.7.3.11

"In existing buildings where special washrooms are intended to be provided, such washrooms shall

a) be equipped with a door capable of being locked from the inside and released from the outside in case of emergency and which has

i) graspable latch operating and locking mechanisms located between 900 and 1000 mm from the floor, and

ii) on outward swinging doors, a door pull not less than 140 mm in length located on the inside so that its midpoint is between 200 and 300 mm from the hinged side of the door and between 900 and 1000 mm from the floor, (see A-3.7.3.8.(1)(b)(iv) in Appendix A),

b) be provided with a lavatory conforming to Article 3.7.3.10.,

c) be equipped with a water closet conforming to Article 3.7.3.9,

d) be equipped with grab bars conforming to Clause 3.7.3.8.(1)(d),

e) have no dimension less than 1700 mm,

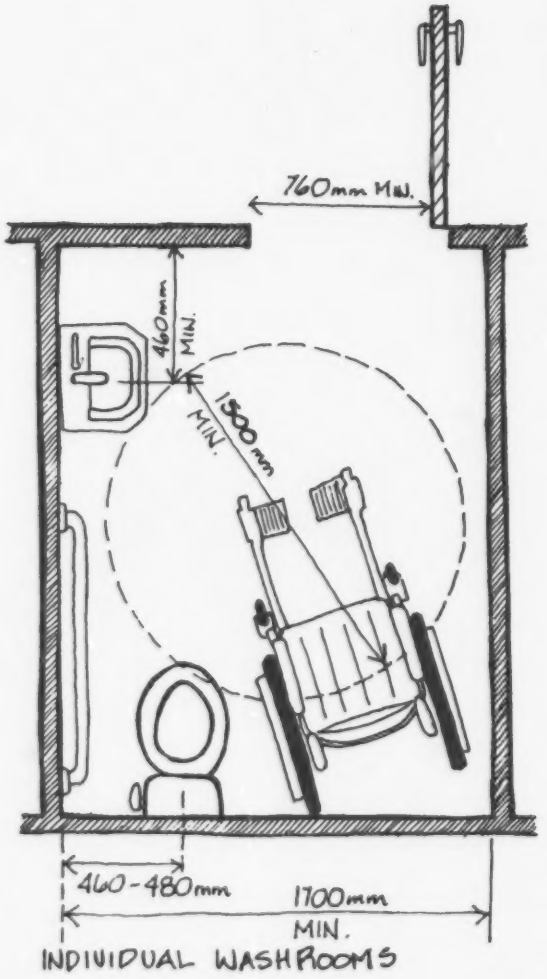
f) have fixture clearances conforming to the fixture clearances described in Articles 3.7.3.8. to 3.7.3.10.,

g) be equipped with a coat hook conforming to Clause 3.7.3.8.(1)(e) and a shelf located not more than 1200 mm above the floor, and

h) have a doorway conforming to Article 3.7.3.3. (See Appendix A.)"

Alberta Building Code 1990 A-3.7.3.11.(1)

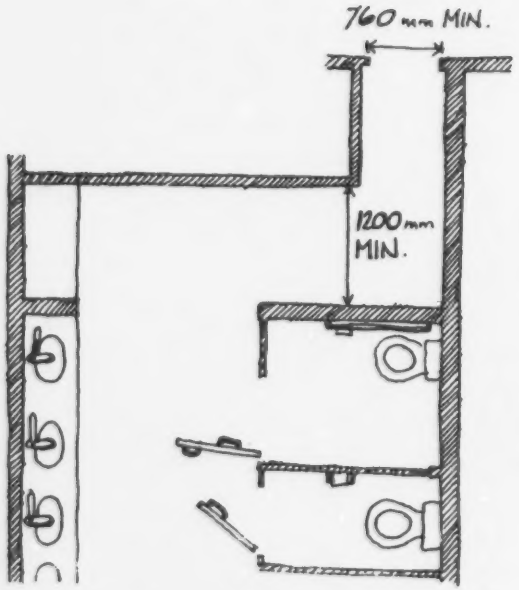
"Unobstructed areas in front of the lavatory, in front of the water closet and on one side of the water closet are necessary for maneuverability of a wheelchair."



INDIVIDUAL WASHROOMS

4.1.3 Comments

The Alberta Building Code provides detailed requirements for accessible public washrooms. There are still some areas of the Code that could be modified to make access more convenient for people with disabilities. These are addressed in Section 4.1.4.



ENTRANCES TO WASHROOMS SHOULD BE EASY TO NEGOTIATE.

Provision of individual washrooms for people with disabilities allows family members or care givers of the opposite gender to provide assistance without the discomfort and inconvenience of choosing either the men's or women's washrooms. These rooms may also be used by parents with infants requiring diaper changes. Including this option increases the use of the room, thereby reducing the opportunity for vandalism.

4.1.4 Proposed Guidelines

4.1.4.1 Entrances

The entrances to washrooms are often difficult or impossible for people with disabilities to use, especially where there are vestibules with two doors. It is desirable either to eliminate the doors or provide only one entry door to washrooms. Washrooms should be designed so that doors are not required simply to prevent the fixtures inside from being viewed by passers-by.

Entrances with an L-configuration should have a minimum depth of 1200 mm to allow a wheelchair to turn the corner easily.[1]

4.1.4.2 Locking Devices

Water closet stalls or enclosure doors should be equipped with locking devices that do not require punching or twisting of the wrist to operate. A lever type locking device is preferred.[2]

4.1.4.3 Water Closet Stall Doors

Water closet stall doors should have a clear opening of 800 mm (this is greater than the 760 mm required by the Building Code) and should be self closing.[3]

4.1.4.4 Width and Depth of Water Closet Stalls

Water closet stalls should have a clear unobstructed space from the closet bowl to the door of at least 1500 mm in width by 1500 mm in depth. This will allow for easy maneuverability of the wheelchair when in the stall.[4]

4.1.4.5 Lavatory Knee Space

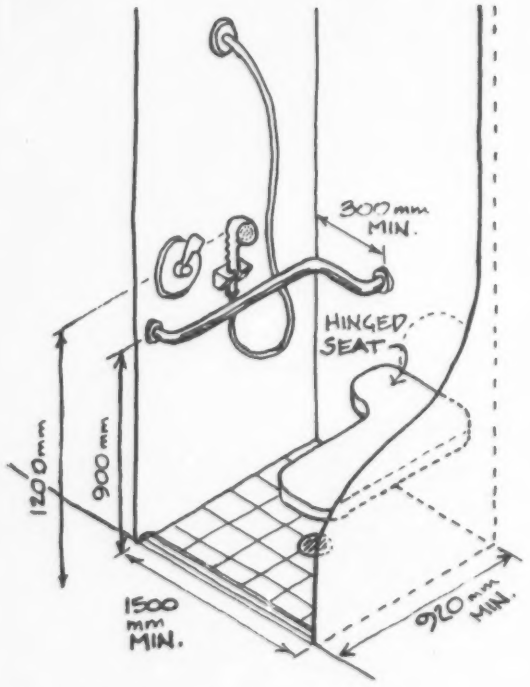
To maximize knee space below the lavatory, "P" traps in drain lines should be offset horizontally so that a minimum of 280 mm is provided from the front of the counter to the face of the "P" trap.

4.1.4.6 Counter Space in Individual Washrooms

A counter with sufficient space to change an infant's diaper should be provided.

Notes

1. Communication from consumer groups.
2. U.S. Architectural and Transportation Barrier Compliance Board, Minimum Guidelines and Requirements for Accessible Design, Final Rule, 1981.
3. City of Calgary, Disabled Access Review Committee.
4. Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, Public Buildings, 1986.



ACCESSIBLE SHOWER STALL

4.2 SHOWER ROOMS

4.2.1 Principle/Rationale

Showers in public facilities should be made accessible to allow people with disabilities to participate in recreational activities. They should have the convenience of being able to take a shower after strenuous activity.

4.2.2 Existing Regulations

Alberta Building Code 1990 3.7.3.12(1)

"Where showers are provided in buildings of assembly occupancy, at least one shower stall shall be barrier-free and shall

a) be not less than 1500 mm in width and 900 mm in depth,
b) have a clear floor space at the entrance to the shower of not less than 900 mm in depth and the same width as the shower, except that fixtures are permitted to project into that space provided they do not restrict access to the shower, (see Appendix A)
c) have a slip-resistant floor surface,
d) have a bevelled threshold not exceeding 13 mm in height above the finished floor,
e) be equipped with a hinged seat that is not spring-loaded or a fixed seat that is

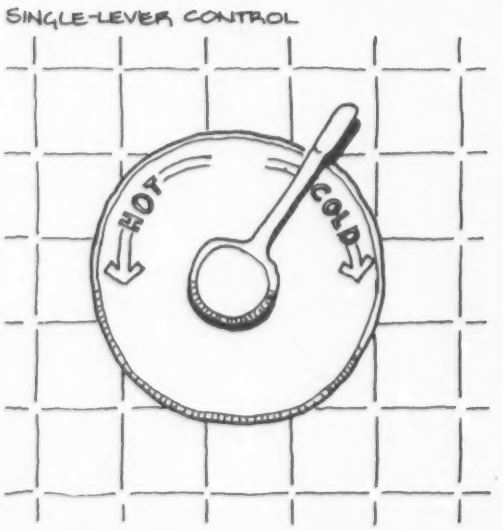
i) not less than 450 mm in width and 400 mm in depth,
ii) mounted approximately 450 mm in width and 400 mm in depth, and
iii) designed to carry a minimum load of 1.3 kN,

f) be equipped with a horizontal grab bar which shall

i) be not less than 900 mm in length,
ii) be mounted approximately 850 mm above the floor,
iii) located on the wall opposite the entrance to the shower so that not less than 300 mm of its length is at one side of the seat, and
iv) conform to Subclause 3.7.3.8(1)(d)(iv),(v) and (vi), (see Appendix A)

g) be equipped with a pressure-equalizing or thermostatic mixing valve controlled by lever or other device operable with a closed fist from the seated position,
h) be equipped with a hand-held shower head with not less than 1500 mm of flexible hose located so that it can be reached from the seated position and equipped with a support so that it can operate as a fixed shower head or a fixed head mounted at a height of 1500 mm, and

i) have fully recessed soap holders which can be reached from the seated position."



4.2.3 Comments

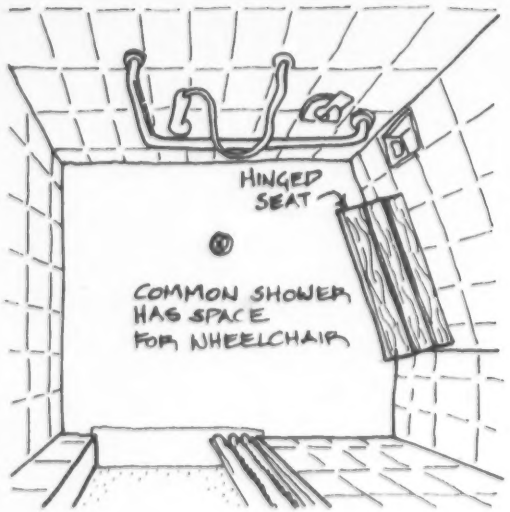
The Alberta Building Code satisfies the main requirements for an accessible shower room. One area the Code does not provide for is common showers. This is discussed under Proposed Guidelines.

4.2.4 Proposed Guidelines

4.2.4.1 Shower Fixtures

A diverter mechanism on the hand held shower should be provided to protect people with disabilities against misdirection of spray.[1]

A shelf for storing soap, a sponge or brush should be provided at 850 mm above floor level.[2]



4.2.4.2 Common Showers

Common showers should have bevelled thresholds 13 mm in height allowing wheelchairs to pass over with minimal hindrance.

A wheelchair should be provided for use in the shower room.[3]

A flexible hand held shower sprayer should be provided.[4]

The slope of shower room floor to drain should be 1 in 20.[5]

4.2.4.3 Individual Change/Shower Room

Similar to individual washrooms, provision of individual change/shower rooms for people with disabilities allows family members or care givers of the opposite gender to provide assistance without the discomfort or inconvenience of choosing either the men's or women's change rooms.[6]

Notes

1. Provincial Accessibility Committee of Saskatchewan, Accessibility Standard, 1980.
2. Communication from user groups.
3. Same as Note 2.
4. Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, 1986.
5. Same as Note 4.
6. Same as Note 2.

4.3 TICKET COUNTERS AND SERVICE COUNTERS

4.3.1 Principle/Rationale

People with disabilities must attend to day-to-day business such as banking, paying bills, and recreational activities such as booking or registering for recreational programs. The height of counter tops can make these tasks difficult. An area for people in wheelchairs to conduct their business at a convenient height and with adequate knee space should be provided.

4.3.2 Existing Regulations

Alberta Building Code 1990 3.7.3.13.(1), (2) and (3)

"(1) All counters more than 2 m long serving the public shall have at least one barrier-free section in conformance with Sentences (2) and (3).

(2) Barrier-free counter surfaces shall be not more than 865 mm above the floor.

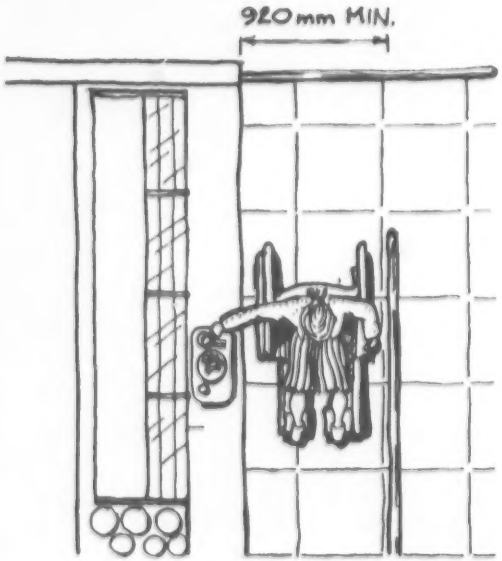
(3) Knee space beneath barrier-free counters intended to be used as work surfaces shall be not less than

a) 760 mm wide,
b) 685 mm high, and
c) 485 mm deep,

(See A-3.7.2.1.(1)(k) in Appendix A.)"

4.3.3 Comments

CAN/CSA-B651-M90, Barrier-Free Design recommends the same counter dimensions as the Alberta Building Code, but also includes a minimum clear floor space of not less than 750 x 1200 mm in front of a counter or work surface to ensure accessibility.



4.3.4 Proposed Guidelines

4.3.4.1 Counters

Counters should be cane detectable and colour/brightness contrasted from their surroundings.[1]

Counter surfaces should have a non-glare, matte finish.[2]

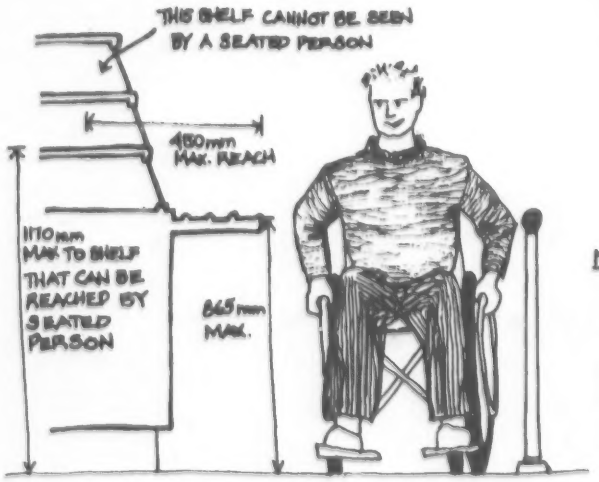
Where a glass partition separates customers from the service personnel, there should be an adequate speaker system to facilitate communication.[3]

4.3.4.2 Cafeterias

The height of counters for conveying trays should be a maximum of 865 mm.[4]

The maximum distance to any liquid dispenser should be within reach limitations of wheelchair users unless employees are behind the cafeteria line at all times.[5]

Food should be located a maximum 450 mm from the edge of the counter.[6]



Notes

1. CNIB, Access Needs of Blind and Visually Impaired Travellers in Transportation Terminals: A Study and Design Guidelines, 1987.
2. Same as Note 1.
3. Same as Note 1.
4. Communication from user groups.
5. Same as Note 1.
6. Same as Note 1.

4.4 INTERIOR SEATING IN PUBLIC FACILITIES

4.4.1 Principle/Rationale

People with disabilities, like most people enjoy going to plays, movies, and sporting events. However, this is often impossible because the of lack of available seating.

4.4.2 Existing Guidelines

Alberta Building Code 1990 3.7.2.2

"The number of spaces designated for wheelchair use in Clause 3.7.2.1.(1)(b) shall be one space for every 125 seats or part thereof. (See Appendix A.)"

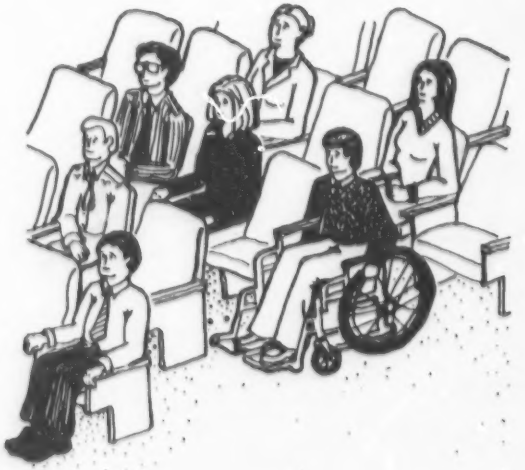
Alberta Building Code 1990 A-3.7.2.2

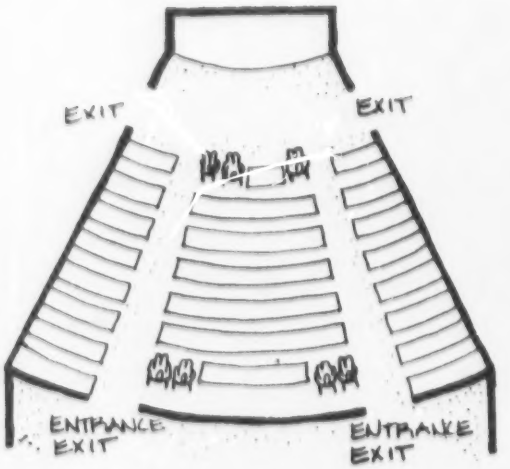
"Seating areas for disabled persons should be scattered rather than located in one place, so as to provide a choice of location for the users."

Alberta Building Code 1990 3.7.3.6.(1)

"Spaces designated for wheelchair use in Article 3.7.2.1 shall be

a) clear and level, or level with removable seats,
b) not less than 840 mm wide and 1525 mm long to permit wheelchairs to enter from a side approach and 1220 mm long where the wheelchair enters from the front or rear to the space,
c) arranged so that at least two designated spaces are side by side,
d) located adjoining a barrier-free path of travel without infringing on egress from any row of seating or any aisle requirements, and
e) situated, as part of the designated seating plan, to provide a choice of viewing location."





ACCESSIBLE SEATING DOES NOT INTERFERE WITH EGRESS OR ACCESS TO OTHER SEATS.

4.4.3 Comments

Removable chairs can be installed in public facilities to accommodate wheelchairs without loss of revenue to the owner. If there is no need for these wheelchair spaces, the seats can be placed back for the general public, so that no revenue loss will occur.

4.4.4 Proposed Guidelines

Spaces provided for persons in wheelchairs should provide sight lines equal to those provided for the majority of the audience.[1]

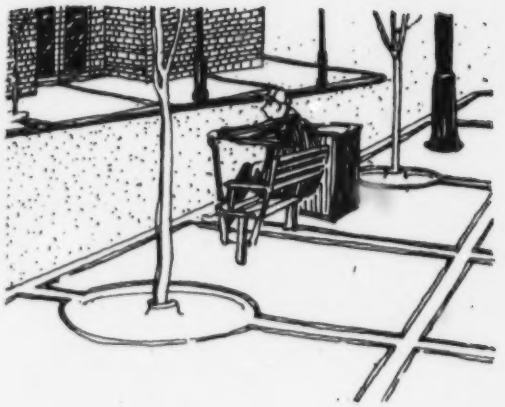
Spaces for persons in wheelchairs should be level, and the path of travel to them should meet the requirements of Section 3.8, "Interior Corridors."

Seats should be provided for persons with orthotics or prostheses. The seats should be at least 600 mm wide.[2]

Notes

1. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988, amended by consumer groups.
2. Communication from consumer groups.

4.5 INTERIOR AND EXTERIOR SITE FURNITURE AND FIXTURES



4.5.1 Principle/Rationale

Site furniture and fixtures play an integral part in creating a functional, enjoyable and accessible environment. They should be designed and located for safety, comfort and convenience and not constitute a hazard.

Readily available resting places are important, especially for those who tire easily.

Winter conditions should not impede the use of exterior site furniture and fixtures, which are intended for year-round use.

4.5.2 Existing Regulations

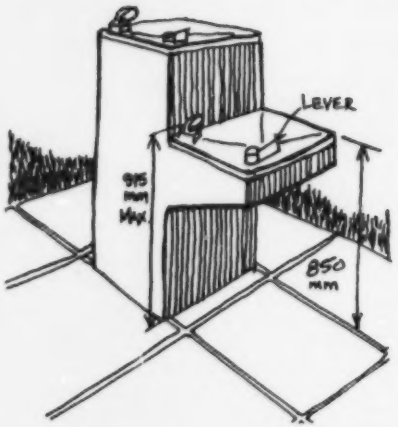
Alberta Building Code 1990 3.3.1.9.(3) and (4).

"(3) Except as provided in Sentence (4), obstructions located within 1980 mm of the floor shall not project more than 100 mm horizontally into exit passageways, public corridors, corridors used by the public or corridors serving classrooms or patients' sleeping rooms in a manner that would create a hazard for visually impaired persons travelling adjacent to walls.

(4) The horizontal projection of an obstruction in Sentence (3) is permitted to be more than 100 mm where it extends to less than 680 mm above the floor."

Alberta Building Code 1990 A-3.3.1.9.(4).

"The sweep of a cane use by blind or visually impaired persons normally detects obstructions that are within 680 mm of the floor. Any obstruction above this height would not normally be detected and can, therefore create a hazard if it projects more than 100 mm into the path of travel."



Alberta Building code 1990 3.7.3.15.(1)

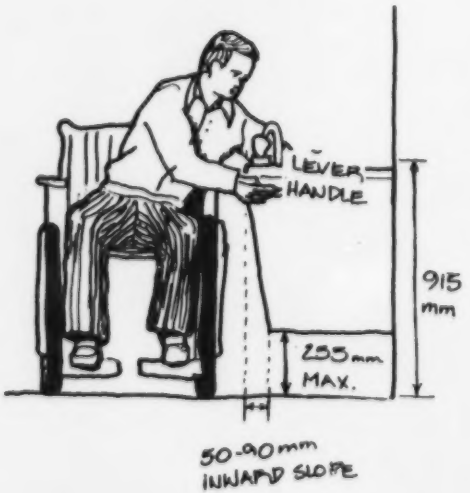
"Where drinking fountains are provided, at least one shall be barrier-free and shall

a) have a spout located near the front of the unit not more than 915 mm above the floor, and
b) be equipped with controls that are easily operable from a wheelchair using one hand with a force of not more than 22 N."

4.5.3 Comments

Neither the Alberta Building Code nor the Calgary Land Use By-law gives standards governing the location of interior or exterior site furniture. This results in a lack of consistency of placement and creates numerous hazards for people with visual impairments. The difference between interior and exterior conditions should be recognized. For the exterior, the standards of climatic protection, illumination, and drainage are important. The choice of materials for site furniture should invite use and be comfortable regardless of the time of year. Winter conditions can make some materials, like concrete and metal unpleasant to use.

As noted in Section 1.1, the prescribed height of 680 mm is too high to be cane detectable, 255 mm is recommended.



4.5.4 Proposed Guidelines

4.5.4.1 Drinking Fountains

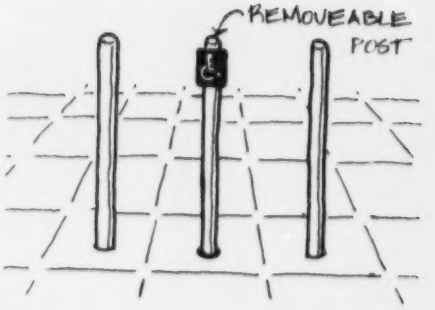
Fountains shall extend to within a maximum distance of 255 mm above the floor, with front panel sloping 50 to 90 mm inwards. This will allow a close side approach for wheelchairs and will not be hazardous for people with visual impairments when using a cane.[1]

4.5.4.2 Permanent Barriers

At least one post barrier should be removable and this should be identified with the international symbol of accessibility. If not, an alternative passageway such as a gate, similarly marked, should be available for access.

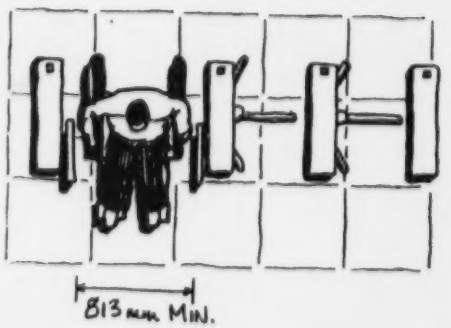
Bollards should be placed to minimize obstruction to pedestrian flow. The minimum clearance between bollards should be 1200 mm. The minimum height should be 610 mm and they should be colour contrasted from the surrounding paving to be more visible.[2]

Chains, cables or ropes are not recommended as permanent or temporary barriers unless they are easily visible. They should be placed at a height of no more than 255 mm and no lower than 150 mm, so they can be detected by the visually impaired.[3]



4.5.4.3 Overhead Signs

Overhead signs should have a clearance of 2100 mm from the bottom edge of the sign to the walking surface.[4]

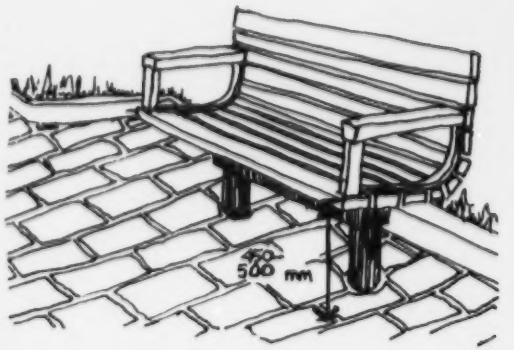


4.5.4.4 Automated-Teller Machines

Where there are several automated-teller machines, at least one of them should be accessible to people in wheelchairs. Where there is only one, it should be accessible. The highest operable control should be 1200 mm from the floor. The knee space should be not less than 685 mm high and 485 mm deep.[5]

4.5.4.5 Benches

Benches with arm and back rests should be adjacent to an accessible route. The seat height should be between 450 and 500 mm from the ground. There should be an adjacent level, firm ground surface at least 850 x 1200 mm to accommodate a wheelchair.[6]

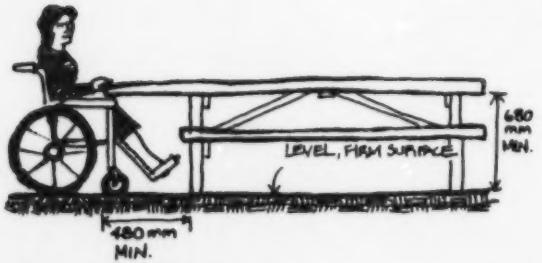


READILY AVAILABLE BENCHES ARE IMPORTANT TO THOSE WHO TIRE EASILY.

Heel space is also necessary to make rising from a seated position easier.[7]

Seat surfaces should be pitched to shed water, but not drain out on to walking surfaces where wetness or ice may create a hazard.[8]

Seat surfaces and vertical supports should be designed to avoid accumulating snow and debris.



PICNIC TABLES

4.5.4.6 Picnic Tables

Picnic tables should be adjacent to an accessible route on a level, firm ground surface. The knee space under the table should be at least 750 mm wide x 480 mm deep x 680 mm high.[9]

Table and seat surfaces should shed water, and be kept free of snow and debris.

4.5.4.7 Trash Containers

Trash containers should be adjacent to, but not obstruct, the walkway.

Trash container designs should include ease of use and exclusion of rain and snow.[10] They should be operable with one hand.

The maximum height of the opening should be 920 mm.

Notes:

1. Communication from consumer groups.
2. Same as Note 1.
3. National Research Council of Canada, National Building Code of Canada, 1985.
4. City of Calgary Planning & Building Department.
5. Same as Note 1.
6. CSA Standard, CAN/CSA-B651-M90, Barrier - Free Design, 1990.
7. Harris, C., and Dine, T., Time-Saver Standards for Landscaped Architecture, 1988.
8. Same as Note 7.
9. Same as Note 6.
10. Same as Note 7.

4.6 PARKS AND PLAYGROUNDS

4.6.1 Principle/Rationale

Parks and playgrounds that are accessible provide an opportunity for people with disabilities to have access to the outdoors and to take an active part in community life.

4.6.2 Existing Regulations

4.6.2.1 Exterior Walks

Alberta Building Code 1990 3.7.3.2.(1)(a) and (b)

"Exterior walks that form part of a barrier-free path of travel shall

a) be provided by means of a continuous plane not interrupted by steps or abrupt changes in level, and
b) have a permanent, firm and slip-resistant surface."

4.6.3 Comments

All recreational areas do not need to be completely barrier-free. A diversity of accessibility within a single recreational area enhances everyone's opportunity to enjoy the outdoors, without "segregation by disability."

4.6.4 Proposed Guidelines

Parks and playgrounds should be accessible from surrounding communities and include a continuous accessible walkway throughout.[1]

Devices such as posts or maze gates designed to prevent vehicular access should not also prevent access to people with disabilities. Posts should have a minimum clearance of 1200 mm. Maze gates should also have a minimum clearance of 1200 mm and a minimum depth of 1500 mm to accommodate a wheelchair's length.[2]

Paths should have firm base, and unprotected joints should not exceed 13 mm in width. This will make travelling easier for people using wheelchairs.[3] Paths should also have positive drainage and good illumination.

Fences, earth berms, or other similar structures used to define a space or give direction should not be higher than 915 mm to 1200 mm to allow a person in a wheelchair to see over them.[4]

Signs pointing out areas of interest or possible hazards should have raised characters. The sign surface should be 1200 mm from the ground and tilted[5] and where appropriate and certainty of use in the evening or winter, well lit.

Protected rest areas should be provided at regular intervals along any walk system. These areas should be placed closer together where the gradient is greater.[6] Where it is appropriate, rest areas should be heat accessible for inclement weather conditions.

The physical organization of a park or playground should be readily comprehensible by those with visual impairments who rely on cognitive mapping for orientation.[7]

Notes

1. Harris, C., and Dines, N., Timer-Saver Standard for Landscape Architecture, 1988.
2. Communication from Consumer groups.
3. Robinette, Gary O., Barrier-Free Exterior Design: Anyone Can Go Anywhere, Van Nostrand Reinhold, New York, 1985.
4. Ries, Michael L., Design Standards to Accommodate People with Physical Disabilities in Park and Open Space Planning, University of Wisconsin-Extension, Wisconsin, 1973.
5. Same as Note 4.
6. Same as Note 4.
7. Same as Note 1.

4.7 RECREATIONAL AND CULTURAL CENTRES

4.7.1 Principle/Rationale

Centres designed and constructed to meet accessibility standards enable people with disabilities to take an active part in community life. Additional consideration should be taken to ensure that the facilities and exhibitions operated in these centres are also accessible.

4.7.2 Existing Regulations

Alberta Building Code 1990 7.3.3.12.(1), (6) and (7)

"(1) Ramps, ladders or recessed stairs shall be provided at the shallow end of a swimming pool if the water depth is greater than 600 mm.

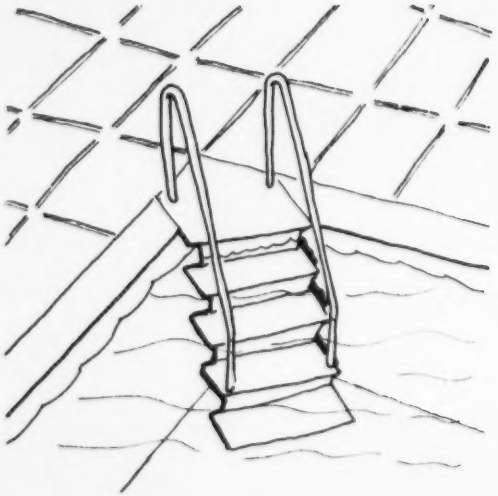
(6) In any swimming pool where stairs or ramps are used they shall have a non-slip surface sufficiently sloped towards the swimming pool to prevent an accumulation of settleable solids.

(7) Stairs and seats or their edges shall be finished in a manner that contrasts with the swimming pool colour."

Alberta Building Code 1990 7.3.3.16.(5) and (6)

"(5) All walks, decks and terraces surrounding a swimming pool shall be uniformly sloped not less than 1:50 and not more than 1:25 to drains or points at which the water will have a free unobstructed flow at all times to points of collection.

(6) A deck surface must be non-slip when wet, sufficiently smooth to facilitate disinfecting and finished so that there will be no discomfort to bare feet."



Alberta Building Code 1990 7.3.3.19.(1), (2) and (3)

"(1) The depth of water in a swimming pool shall be plainly marked at the points of minimum depth, maximum depth, 1.2 m depth, and at the point of break between gentle and steep bottom slopes.

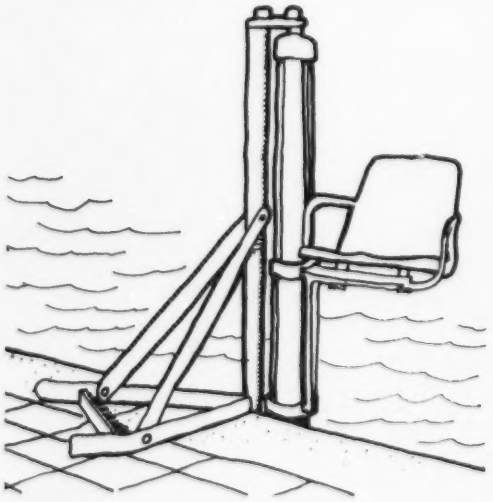
(2) The words "DEEP AREA" and "SHALLOW AREA" shall be clearly marked at appropriate locations.

(3) Depth markings for a swimming pool to indicate the depth shall be placed on the deck in legible numerals at least 100 mm in a colour contrasting with the background and be visible both by day and under artificial lighting."

4.7.3 Comments

The Alberta Building Code recommends that ramps or stairs should be provided at the shallow end of the pool to provide adequate access.

POWER HOIST



4.7.4 Proposed Guidelines

4.7.4.1 Swimming Pools

There should be a ramp and stairs with handrails located at the shallow end of the pool.[1]

Stairs should be provided rather than ladders whenever possible, since stairs are more easily negotiated and can be used to sit upon if wide enough.[2]

It is recommended that power hoists should be provided in pools, to assist people in wheelchairs getting in and out. Ramps may be difficult for some people with disabilities to use.[3]

4.7.4.2 Ice Rink/Exercise Areas

Level access should be provided to ice rinks and exercise areas.

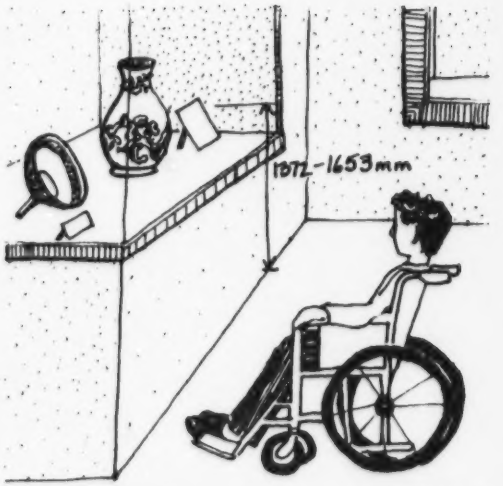
4.7.4.3 Exhibitions

Visual information should also be given audibly.[4]

Exhibition areas should be barrier-free or an alternative method of interpreting the message should be provided, such as audio-visual presentation, or the next best alternative in a location that is accessible.[5]

Important artifacts, labels and graphics should be placed at an elevation which makes viewing comfortable (1372 mm to 1653 mm above ground level) for all visitors. Labels on horizontal surfaces should be tilted to allow for better viewing.[6]

Lighting fixtures should be designed and placed in such a way that no glare or reflection is created on the illuminated object.[7]



LABELS ON HORIZONTAL SURFACES SHOULD BE TILTED.

Notes

1. Robinette, Gary O. Barrier-Free Exterior Design: Anyone Can Go Anywhere. Van Nostrand Reinhold, New York, 1985.
2. Same as Note 1.
3. Communication from consumer groups.
4. Same as Note 3.
5. Minister of the Environment, Design and Parks Programs, Canada, 1989.
6. Same as Note 5.
7. Same as Note 5.

5.0 COMMUNICATION

5.1 PUBLIC TELEPHONES

5.1.1 Principle/Rationale

Public telephones that are not accessible to people with disabilities denies a basic service that most of us take for granted.

5.1.2 Existing Regulations

Alberta Building Code 1990 3.7.3.14.(1)-(5)

"(1) Where built-in shelves or counters are provided for public telephones, they shall be level and shall

a) be not less than 350 mm deep, and

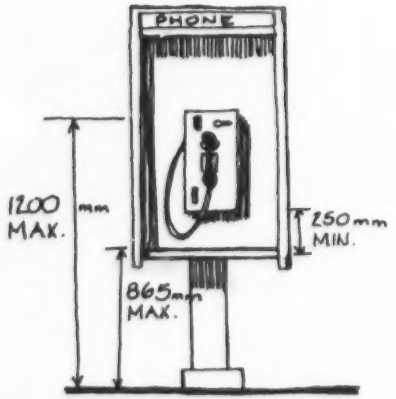
b) have, for each telephone provided, a clear space not less than 250 mm wide having no obstruction within 250 mm above the surface.

(2) The top surface of a section of the shelf or counter described in Sentence (1) serving at least one telephone shall be not more than 865 mm above the floor.

(3) Where a wall-hung telephone is provided above the shelf or counter section described in Sentence (2), it shall be located so that the receiver, coin slot and controls are not more than 1200 mm above the floor. (See Appendix A.)

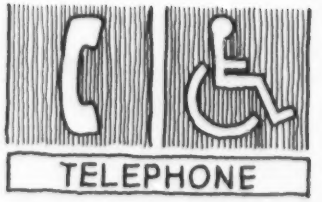
(4) Where public telephones are provided, at least one telephone shall be provided with a variable volume control on the receiver.

(5) Where public telephones are provided in entrance foyers of buildings classified as Group A, Group B Division 1, hospitals in Group B Division 2, police stations in Group D, or Group E, or in lobbies of hotels and motels, at least one telephone shall be provided with a built-in telecommunication device for the deaf (TDD)."



5.1.3 Comments

Telephones are essential for communication and providing a sense of security. Where several public telephones are grouped together, at least one of them should be accessible to people in wheelchairs and those with hearing difficulties. Where there is only one, it should be wheelchair accessible and have a variable volume control.



5.1.4 Proposed Guidelines

Accessible pay telephones should be identified with the International Symbol of Access.[1]

Telephones should be offset with a space beside them to provide room for the TDD carried by many deaf people.[2] The space can also serve other people as a place to put packages.

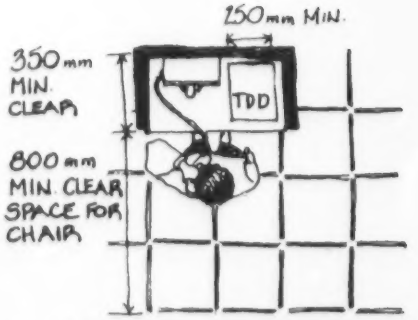
A pay telephone should be mounted on a wall, on a freestanding pylon or in an enclosure which will allow access of a wheelchair to the telephone, and still be cane detectable.[3]

All telephones should have push button controls for easy dialing.[4]

The length of the cord from the telephone to the handset should be a minimum of 1000 mm.[5]

There should be 760 mm clearance from the floor surface to the underside of any enclosure or shelf.[6] There should be a minimum clear floor space of 800 mm in front of a telephone to allow access for people in wheelchairs.

A bench that is either stationary or swing away should be considered near an accessible telephone.[7]



TELEPHONE SHOULD BE OFF-SET TO PROVIDE ROOM FOR A TDD

The minimum illumination level on operating mechanisms, the directory, and shelf should be 200 lx.[8]

Protection from prevailing winds and blowing snow should be considered for exterior telephones. In addition, ambient noise, such as vehicular traffic, should be considered when locating exterior telephones or a means to minimize the noise, such as an enclosed booth, should be included. This will make communication easier for people who are hard of hearing.[9]

Notes

1. Rehabilitation Society of Calgary, Accessibility Standards and Guidelines, Public Buildings, 1986.
2. Fitz Patrick, M., Barkow, B., and Beattie, J., Intercity Travel and the Deaf and Hard of Hearing Traveller, 1990.
3. Same as Note 1.
4. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.
5. CAN/CSA-B651-M90, Barrier-Free Design, 1990.
6. Same as Note 1.
7. Ries, M., Design Standards to Accommodate People with Physical Disabilities in Park and Open Space Planning, 1973.
8. Same as Note 5.
9. Communication from consumer groups.

5.2 ASSISTIVE LISTENING DEVICES

5.2.1 Principle/Rationale

Many people who use hearing aids have difficulty functioning in noisier environments, or when the speaker or speakers are at a distance. There are several systems available which can overcome the combined problems of distance and background noise.[1]

5.2.2 Existing Regulations

Alberta Building Code 1990 3.7.3.7.(1) and (2)

"(1) Except as permitted in Sentence (2), in buildings of assembly occupancy, all classrooms, auditoria, meeting rooms and theatres with an area of more than 100 m² shall be equipped with an assistive listening system encompassing the entire seating area.

(2) Where the assistive listening system required in Sentence (1) is an induction loop system, only half the seating area in the room need be encompassed. (See Appendix A.)"

5.2.3 Comments

Types of assistive listening systems include induction loops, FM radio frequency systems, and infrared systems. All these systems aid fearing without disturbing the listening enjoyment of other people. The choice and size (power) of the system will depend on the type of application and the size of the room.[2]

5.2.4 Proposed Guidelines

5.2.4.1 Induction Loops

Induction loops should be considered in box offices, ticket and other counters, alcoves within large spaces, as well as in theatres, halls and churches.[3]

Counters equipped with loops should be clearly signed and in regular use.[4]

5.2.4.2 FM Radio Frequency Systems

FM Systems should be considered in large public facilities, such as airports and other transport terminals. When clearly marked, the FM broadcast area provides the traveller with an easily located listening zone, so that all information, especially important announcements, is readily available.[5]

5.2.4.3 Infrared Systems

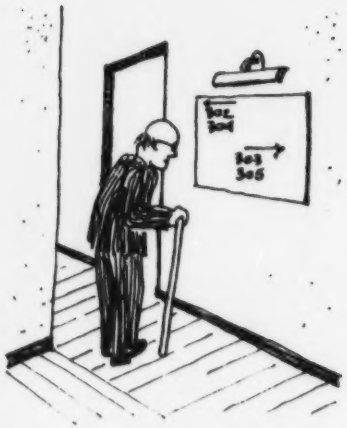
Infrared rays are contained within an enclosed space in which they are being used for transmission. Individual transmissions should be blocked by solid barriers so there will be no interference.[6]

The system should be shielded from the sun, or the strength of transmission increased to avoid interference.[7]

Notes

1. FitzPatrick, M., Barkow, B., and Beattie, J., Intercity Travel and the Deaf and Hard of Hearing Traveller, 1990.
2. CSA Standard, CAN/CSA-B651-M90 Barrier-Free Design, 1990.
3. Thorpe, S., Designing for People with Sensory Impairments, 1987.
4. Same as Note 3.
5. Same as note 1.
6. Same as note 1.
7. Same as note 1.

5.3 SIGNAGE



5.3.1 Principle/Rationale

The purpose of signs is to provide information and direction. They should be strategically placed for high visibility and be simple and consistent for easy comprehension. Raised characters provide tactile cues for the blind.

5.3.2 Existing Regulations

5.3.2.1 Location

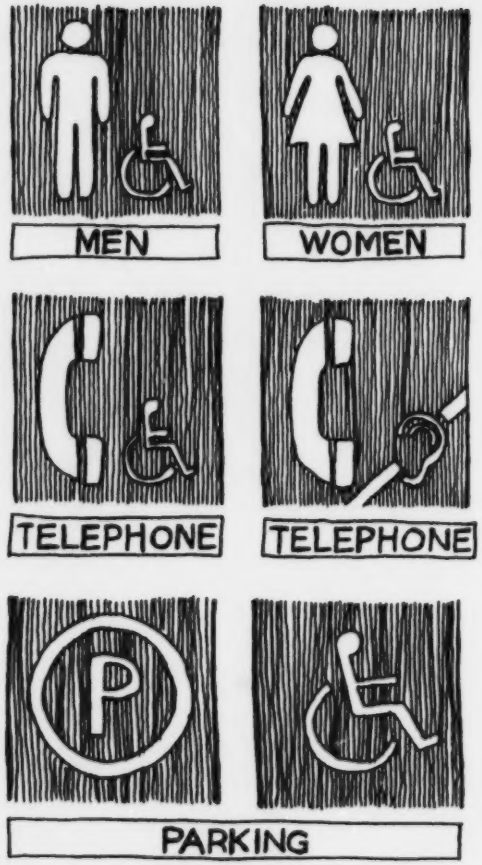
Alberta Building Code 1990 3.7.3.1.(1), (2) and (3)

"(1) Where a building is required to have an entrance to accommodate disabled persons, signs incorporating the international symbol of accessibility for disabled persons shall be installed where necessary to indicate the location of that entrance.

(2) Where a washroom, elevator or parking area is required to accommodate disabled persons, it shall be identified by a sign consisting of the international symbol of accessibility for disabled persons and such other graphic or written directions as are needed to indicate clearly the type of facility available.

(3) Where a washroom is not designed to accommodate disabled persons in a storey to which a barrier-free path of travel is required, signs shall be provided to indicate the location of barrier-free facilities. (See Appendix A.)"

INTERNATIONAL SYMBOL OF ACCESS-IBILITY INDICATES AREAS OR FACILITIES WHICH ALLOW FREEDOM OF MOVEMENT OR OPERATION



5.3.2.2 International Symbol

Alberta Building Code 1990 A - 3.7.3.1

"The official symbol indicates to disabled persons that they will have reasonable freedom of movement within a building so signed. The symbol is usually white on a blue background; where these colours do not stand out, the sign can be set on a white background. An arrow can be added to indicate direction or the location of an accessible space or facility."

5.3.2.3 Special Equipment

Alberta Building Code 1990 3.7.3.1.(4)

"Where special equipment is provided for disabled persons, such a special door opening controls, variable volume controls on telephones, or telecommunication devices for the deaf (TDD), they shall be identified by an appropriate symbol and provided with instructions for their use. (See Appendix A.)"

Alberta Building Code A-3.7.3.1.(4)

"Accessibility for the Deaf. The international sign indicating accessibility for the deaf and hard of hearing should be used to indicate the availability of variable volume controls on telephones, telecommunication devices for the deaf (TDD) and assistive listening systems. Locations of assistance for blind persons should be identified with the appropriate symbol."

5.3.2.4 Tactile Signs

Alberta Building Code 1990 3.7.3.1.(5)

"Doors and openings that lead from public places and through which the public is permitted to enter shall be identified by specific tactile signs with letters

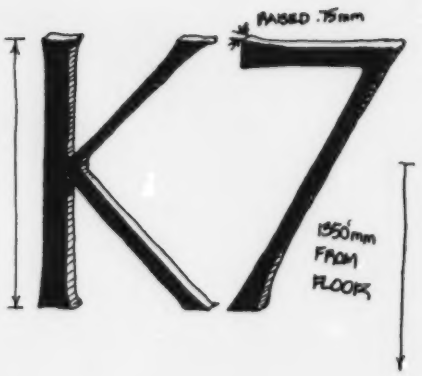
a) not less than 60 mm high and raised 0.75 mm above the surface, and
b) located 1 350 mm above the floor surface and beginning not more than 150 mm from the door or openings."

5.3.2.5 Floor Numbering

Alberta Building Code 1990 3.4.6.17.(1)

"Arabic numerals indicating the assigned floor number shall

a) be mounted permanently on the stair side of the wall at the latch side of doors to exit stair shafts,
b) be not less than 60 mm high, raised approximately 0.75 mm above the surface,
c) be located 1350 mm from the finished floor and beginning not more than 150 mm from the door, and
d) be contrasting in colour with the surface on which they are applied."



5.3.3 Comments

Signs and symbols should be kept simple and consistent. Symbols are preferable to words, particularly for those with language or reading difficulties. Consideration of lettering size and style, use of strong/bright colours, and a non-distracting background should ensure legibility.

Standard symbols should be used to identify washrooms and for which gender they are designated, to allow easy comprehension by people with cognitive disabilities.

All public buildings should be required to have signs indicating accessible facilities within. These signs should be located near the entrance to direct people upon entry to the building and placed along the route to provide reassurance, which is essential to people with cognitive impairments.

5.3.4 Proposed Guidelines

5.3.4.1 Lettering and Numbers

Lettering and numbers should be large.[1]

Lettering and numbers should have a width-to-height ratio between 3:5 and 1:1 and have a stroke-width-to-height ratio between 1:5 and 1:10[2]

No ornate lettering should be used on signs because it is difficult for people who are visually or cognitively impaired to read.[3]

Contrasting colours should be used on signs to provide easy reading, especially people who are visually impaired.[4]

Raised letters, numbers and symbols should be within reach at a reasonable height. They should be confined to single characters. They should be located at standard positions within a building.[5]

5.3.4.2 Location of Signs

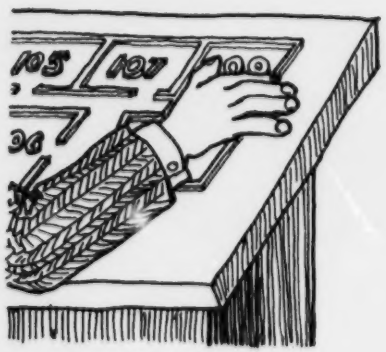
Direction signs should be placed at focal points on main traffic routes. Signs should be located to indicate a through route, with a location sign at the destination.[6]

Suspended signs that must be placed overhead should have a clearance of 2100 mm from the bottom edge of the sign to the walk surface.[7]

5.3.4.3 Building Direction Maps

Directional maps should be located at the entrances to buildings at a height of 760 mm. This will allow persons in wheelchairs to read them easily. Raised characters should be used for people who are blind.

BUILDING DIRECTION MAP



Notes

1. Communication from consumer group.
2. CSA Standards, CAN/CSA-B651-M90, Barrier-Free Design, 1990.
3. Same as Note 1.
4. Same as Note 1.
5. Thorpe, S., Designing for People with Sensory Impairments, 1986.
6. Saskatchewan Human Rights Commission, Accessibility Standards Guidelines, 1988.
7. City of Calgary, Planning & Building Department.

5.4 AUDIBLE PEDESTRIAN TRAFFIC SIGNALS

5.4.1 Principle/Rationale

Audible pedestrian traffic signals assist in safe travel across an intersection. The audible signal acts as confirmation of the traffic flow and as a directional indicator for people who are blind, and often serves as a pacer to people who are cognitively impaired.

5.4.2 Existing Regulations

Currently there are no regulations governing audible pedestrian traffic signals.

5.4.3 Comments

Audible pedestrian traffic signals should be located at crosswalks where there is a high use from pedestrians who are visually impaired or where traffic conditions are complex. One audible sound unit should be installed at each end of a crosswalk. When the unit is operated, a tone sounds for the full duration of the "walk" interval.

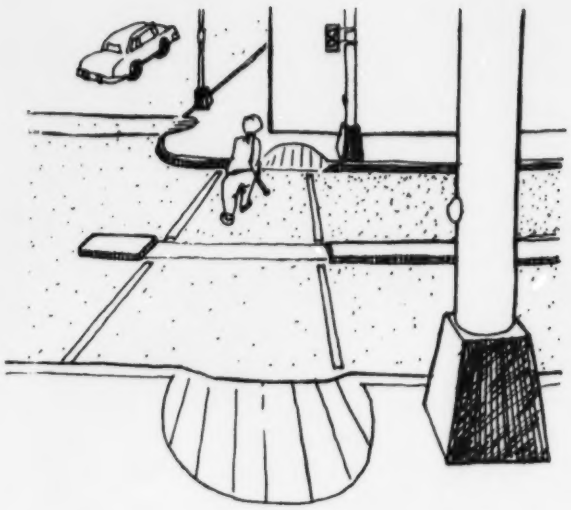
5.4.4 Proposed Guidelines

When audible light signals are utilized, they should be closely monitored for mechanical malfunctions.[1]

If push buttons are used, they should be placed on the first pole away from the intersecting street, on the side of the pole parallel to the crosswalk.[2]

Push buttons, which activate visual pedestrian signals should also operate the audible pedestrian indications.[3]

The audible sound cue should be clearly audible above the ambient noise of the crosswalk area.[4]



PEDESTRIAN CROSSING SHOULD BE EQUIPPED WITH BOTH VISUAL AND AUDIBLE PEDESTRIAN TRAFFIC SIGNALS.

Under normal crosswalk conditions, the number of tones to be used should be 2. One tone should be for pedestrians crossing in the east-west direction, and a second, different tone should be for pedestrians crossing in the north-south direction.[5] For safety, the two tones should be consistent throughout the city.

All traffic signals should be set to allow sufficient time for pedestrians to safely complete the crossing.[6]

Notes

1. CNIB, Access Needs of Blind and Visually-Impaired Travellers in Transportation Terminals, 1987.
2. Technical and Research Committee Council on Uniform Traffic Control Devices, Audible Pedestrian Indications, 1990.
3. Same as Note 2.
4. Same as Note 1.
5. Same as Note 2.
6. Same as Note 1.

5.5 DETECTABLE WARNING SURFACES

5.5.1 Principle/Rationale

Detectable warning surfaces identify any hazards, such as changes in grade, to people with visual impairments. A uniform system is essential for easy and immediate comprehension.

5.5.2 Existing Regulations

Alberta Building Code 1990 3.3.1.7.(2)

*"In a **barrier-free** path of travel a downward change in elevation shall be signalled by the use of a 600 mm wide tactile warning strip placed 250 mm from the edge and for the full width of a stair, escalator, moving walkway, ramp or platform and identified using colour and brightness contrast."*

5.5.3 Comments

Detectable warning surfaces are not commonly used. Further research is required to achieve a higher level of standardization and effectiveness. A tactile warning system should be limited in its application to specific design elements to prevent diverse individual interpretations and usages of such an important warning system.[1]

CAN/CSA-B651-M90, Barrier-Free Design requires that detectable warnings on walking surfaces shall be at least 900 mm long, which is preferred to the 600 mm in the Alberta Building Code. The 900 mm detectable warning surface ensures that people will detect it regardless of stride length.

5.5.4 Proposed Guidelines

All detectable warning surfaces in a building must be consistent in: placement, materials used, and the warning message they convey to people with visual impairments.[2]

A detectable warning surface should consistently present detectable differences in resiliency, texture, colour/brightness contrast, and sound in order to be discernible to a maximum number of people with visual impairments. The textural difference should be sufficient to enable easy detection under foot or a long cane tip.[3]

There should not be any flooring material utilized in a building which could be confused with the detectable warning surface.[4]

Tactile warning strips are recommended at both the top and bottom of stairways and ramps.[5]

Notes

1. CNIB, Access Needs of Blind and Visually Impaired Travellers in Transportation Terminals, 1987.
2. Same as Note 1.
3. Same as Note 1.
4. Same as Note 1.
5. Communication from Consumer Groups.

6.0 FUTURE CONSIDERATIONS

6.1 AREAS REQUIRING ATTENTION

The ACCESS Design Guidelines, although founded on the Alberta Building Code 1990 and other documents already in use, often exceeds them to increase accessibility. While attempting to broaden the guidelines' focus on the needs of people with disabilities to include the categories of mobility, sensory, and cognitive, as well as seniors, it acknowledges that further research should be undertaken and incorporated. The following areas need attention.

- Design solutions responding to winter conditions, although briefly included in these guidelines, to encourage positive outdoor experiences for everyone.
- Implementation of a pedestrian/wheelchair right of way, unencumbered with extraneous traffic fixtures and other inconsistently placed obstacles, to ensure the safety and convenience of pedestrians and those in wheelchairs.
- Further research and development of a uniform detectable warning surface system to provide consistent sensory information to people with visual impairments.
- Inclusion of any new technology, which improves access.
- Inclusion of barrier-free residential requirements, since there is such a shortage of accessible housing that is available and/or economical.

Any suggestions for improvements or identifying any oversights in these guidelines will always be welcomed.

GLOSSARY, REFERENCES AND INDEX

GLOSSARY

Aging Disability - An effect of the aging processes that significantly reduces mobility, flexibility, coordination and perceptiveness.

Ambulatory - Able to walk without artificial aids.

Area of Refuge - An area that will hold occupants until they can exit or where they can wait during a fire or similar emergency for a period of time.

Barrier-Free Design - The incorporation and utilization of design principles to construct an environment that is functional, safe, and convenient for all users, including those with any type of disability.

Blind - No or severely reduced sight.

Cognitive Disability - Any loss or disturbance of the mental processes of comprehension, judgement, memory and reasoning.

Deaf - No or severely reduced hearing.

Detectable Warning Surface - A material, different in tactility from surrounding surfaces, to provide warning by being detectable under foot, and provide a noticeably different sound when struck with the long cane.

Disability - Any definable restriction or lack of ability to perform an activity in the manner or within the range considered usual for a human being.

FM Radio Frequency System - A system to convert sound to a designated FM frequency. The FM signal is then converted back to sound by a small transmitter worn by the system user. It carries the sound directly to the user, while cutting out any background noise.

Coefficient of Friction - The measure of the resistance that a body encounters in moving over another.

Handicap - An artificially imposed disadvantage of an individual resulting from environmental and social barriers.

Hard-of-Hearing - The ability to hear to some extent with or without an amplification device such as a hearing aid.

Hazard - An architectural or environmental obstruction in the path of travel that cannot be readily detected and negotiated.

Impairment - Any loss or disturbance of psychological, physiological or anatomical structure and functioning of the body.

Individual Washroom - A washroom containing one toilet and one lavatory.

Induction Loop - An insulated cable laid around a listening area, with a microphone or other input source such as a TV or loop amplifier. The loop sets up a magnetic field so that a person using a hearing aid with a pick-up coil can receive sound without loss or distortion due to bad acoustics or extraneous noise.

Infrared Systems - The uses of light rays for the transmission of sound.

KiloNewton (kN) - A unit of force equal to one thousand Newtons.

Lux (lx) - A unit of illumination.

Metre (m) - A unit of length in metric system.

Newel - A centre pillar of winding stairs, or a post supporting stair - handrail at top or bottom.

Newton (N) - A unit of force. One Newton acting for one second on a mass of one kilogram gives it a velocity of one metre per second.

Non-Ambulatory - Unable to walk; in need of a wheelchair.

Obstacle - An architectural or environmental obstruction in the path of travel that can be easily detected and negotiated. It can also serve as a landmark and assist in orientation.

Orthotics - A device designed to activate or supplement weakened or atrophied limbs or functions.

Prosthesis - An artificial device to replace a missing part of the body.

Semi-Ambulatory - Able to walk only with the aid of braces, crutches or a walker, due to an arthritic or other disabling condition.

Sensory Information - Visual, tactual and auditory information.

Telecommunication Device for the Deaf (TDD) - Any device, such as a teletypewriter or Visual Ear, which provides persons who are deaf with access to the public telephone network, by enabling them to type and read their messages over telephone lines.

Turnstile - A device set in an entrance for the purpose of controlling or counting persons entering.

Visual Impairment - Partial or total loss of sight.

Water Closet - A toilet bowl and its accessories.

Winter City - A city in which the average maximum daytime temperature is equal to or less than 0°C for a period of at least 2 months (Pressman, 1988).

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